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PESTICIDES ABSTRACTS (formerly Health Aspects of Pesticides Abstract Bulletin) is a monthly publication of the Technical Services Division of the Office of Pesticide Programs, Environmental Protection Agency.

The purpose of this publication is to foster current awareness of the major worldwide literature pertaining to the effects of pesticides as defined in the Table of Contents. The publication represents a monthly review of more than 2,000 primary and secondary sources. A list of periodicals from which articles have been abstracted appears annually in the January issue. Subjects and authors of abstracted articles are cross-referenced in quarterly and annual indexes. Reprint requests should be directed to the author of the complete article.

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CONTENTS

Volume 12 **May 1979** **No. 5**

Page

General 253
(News items, letters, and editorials appearing in scientific and technical journals; information on production and use; and other items of general interest)

Monitoring and Residues 259
(levels of pesticides in people or nonexperimental animals or in water, air, soil, food, feed, and other consumer products)

Epidemiology, Prevention and Treatment 267
(Frequency and distribution of pesticide poisoning in man or nonexperimental animals and treatment of clinical cases; morbidity and mortality; safety measures; decontamination; disposal of containers and wastes; legislation and regulations)

Toxicology and Pharmacology 273
(Toxicity studies in man and animals; effects on cells; organs, and systems; metabolic studies, biochemistry, interactions; antidotes and other treatment; mode of action. Ordinarily, articles dealing with efficacy studies are not included.)

Analysis 295
(preparation of samples; analytical methods; instrumentation)

79-1001. Ferm, R.; Renberg, L. (Natl. Swed. Environ. Prot. Board, S-17120 Solna, Sweden) **An industrial cover-up: the case of BT Kemi.** *Ambio* 7(5-6): 211-217; 1978. (11 references)

BT Kemi, a chemical manufacturing company located in Teckomatorp in southern Sweden, had been a producer of pesticides from 1965 to 1977. Wastes from these and other toxic chemicals were illegally discharged into an adjacent stream, causing dangerous levels of chlorinated phenols and phenoxy acids to occur in water and fish. It was also discovered in 1975, and again in 1977, that the company had illegally buried more than 600 drums of toxic wastes containing high levels of pesticides such as chlorinated phenols, phenoxy acids and their esters, dinoseb, and lindane. PCBs, chlorinated dioxins and dibenzofurans were also detected in investigations which were carried out by the authorities under the auspices of private consulting firms. The factory was finally closed in 1977 after extensive studies by the Swedish government costing over 1.8 million. It is estimated that this much more in funds will be needed to decontaminate the area around the BT Kemi grounds.

79-1002. Anonymous **Chemicals and the environment.** *Ambio* 7(5-6): 240-243; 1978. (32 references)

An excerpt from the annual report of the United Nations Environment Program "The State of the World Environment 1978" is presented. Chemical substances enter man and the environment through complex paths which include direct routes (such as the application of fertilizers, pesticides, and herbicides), combustion processes, and waste flows from the manufacture, transport and consumption of products. Harmless chemicals may be transformed into toxic ones in the environment and may enter the food chain where bioaccumulation may take place. Chemical pesticides of more than 1000 varieties are used globally. The more slowly degraded organochlorines, such as DDT, aldrin, and dieldrin present particular problems due to their long persistence and ubiquity. More information is known about the short-term toxicity of many chemicals than is known about their long term effects. The increase in environmental contamination by hazardous wastes is becoming a national as well as an international problem which may only ultimately be controlled by preventing the use of certain chemicals.

79-1003. Prosser, P. R. (Dep. Med., Tulane Med. Sch., New Orleans, LA 70112) **Silent glands.** *Arch. Intern. Med.* 1389(2): 143-144; 1979. (11 references)

This letter to the editor calls attention to changes in the endocrine glands as a result of environmental pollutants, specifically as a result of exposure to commonly used pesticides. The first of the two described syndromes is an insulin deficient ketosis-prone form of diabetes mellitus accompanied by severe debilitating autonomic and peripheral polyneuropathy, which has been found in almost every person who has survived the ingestion of PNU (vacor), a rodenticide. The second endocrine system change is infertility characterized by azoospermia or oligospermia, with elevated serum levels of follicle-stimulating hormone and luteinizing hormone implying testicular failure, resulting from exposure to DBCP.

79-1004. Davis, E. E. (Dep. Bot. & Microbiol., Auburn Univ., Auburn, AL 36830) **Herbicides in peace and war.** *BioScience* 29(2); 84,91-94; 1979. (13 references)

Before World War I and II, herbicides were hardly used and the number of effective compounds existing was very small. In the course of study of plant auxins during the war era, the plant destroying properties of 2,4,-D and 2,4,5-T, both plant growth regulators, were discovered. It was not until some time later that the use of these compounds as herbicides caught on for large scale commercial use, and not until the Vietman War that the effects of these compounds on the environment were studied. The mutagenicity, carcinogenicity, and teratogenicity of many pesticides were sudied in numerous animal feeding experiments that often used extremely large dosages that could not be correlated with situations in the extra-laboratory environment. One important result of these experiments was the identification of TCDD contamination of 2,4,5-T which, in many cases, was responsible for the toxicity of this phenoxy-herbicide. Data began to be collected on the contamination of the food chains from the Herbicide Orange spraying programs used for defoliation during the Vietnam War. More recent incidents of environmental pollution by herbicides include the disaster of widespread TCDD contamination at Seveso due to an accidental explosion at a North Italy plant. From these previous cases of carelessness in connection with herbicides, the public seems to have taken a position of over-caution in the use of such herbicides as 2,4-D and 2,4,5-T.

79-1005. Galston, A. W. (Dep. Biol., Yale Univ., New Haven, CT 06520) **Herbicides: a mixed blessing.** *BioScience* 29(2): 85-90; 1979. (52 references)

In this review on the safety and uses of the herbicides 2,4,5-T and 2,4-D, the benefits of the herbicides to the US as well as concerns over its possible toxicity and misuse are recounted. The highly toxic contaminant of 2,4,5-T, TCDD, has been tested in numerous animal carcinogenicity and teratogenicity tests. The over-concern of the public for the controlled use of such herbicides is understood in light of the results of studies on Agent Orange used in Vietman and the contamination incident at Seveso, Italy. TCDD has been found to be teratogenic even in small doses to rats and other laboratory animals. Studies on the fate of 2,4,5-T and its dioxin impurities in the environment are often misleading as different results have been reported when different methods of analysis have been used. Many cases of toxicity of 2,4,5-T in humans have been reported and include damage to fetuses due to maternal exposure to the herbicide. From these and other studies it can be seen that use of herbicides must be reevaluated. New methods of toxicity testing and detection of toxic impurities in herbicidal products will need to be developed to ensure the welfare and safety of the public and the environment.

79-1006. Schlesinger, R. B. (Inst. Environ. Med., New York Univ. Med. Cent., New York, NY 10016) **Natural removal mechanism for chemical pollutants in the environment.** *BioScience* 29(2): 95-101; 1979. (32 references)

The levels of pollutants in any of the ecospheres, hydrosphere, lithosphere, or atmosphere, are in a constant state of flux so that we can assume that pollutants leave one sphere to enter another, or that they are changed in form within the original sphere that they are found in. The self-purification of the spheres necessitates the transfer of pollutants into sinks (or spots within other spheres) and these sinks may be the recipients of pollutants that are transferred via chemical, physical, or biological means. There are two major forms of pollution, particulate and gaseous. Particulate pollution may be transferred from the atmosphere to other spheres by dry (simple settling) or wet (rainout or washout) methods. Rainout is the incorporation of a particle into precipitation elements within the clouds, while washout involves the incorporation of a pollutant into precipitation below cloud level (removal by collision with falling rain). Pollution is cleared from the hydrosphere by physical, chemical and biological pathways. An example is given of self-purification of a stream after sewage discharge. The purification of pollutants from the soil such as industrial wastes, pesticides, and other persistant substances also relies on physical, chemical, and biological processes. A chart of chemical air pollutants, their anthropogenic sources, main sinks for deposition, and estimates of atmospheric retention times, and some examples of major sinks and sources of hydrospheric and lithospheric pollutants are also given.

79-1007. Anonymous **Fire ant parasites: a mirex alternative?** *BioScience* 29(2): 128; 1979.

An alternative biological control to the use of mirex for control of the persistent fire ant in the Southern states has been investigated with favorable results in field tests. The parasitic mite, *Pyemotes tritici*, when introduced into nests of the ants can effectively parasitize the ants, including the queen, and eventually destroy the colony. Since the EPA ban on mirex in June of 1978, the farmers have complained of millions of dollars in losses due to interference to crops, and cattle deaths due to ant attacks on newborn calves and pigs. *P. tritici* has several advantages for use as a biological pest control means. A single female of the species can produce 100 offspring, 95 of which will be female. The life cycle of the mite is only four to seven days long, and all mites are born in the adult stage with the capability of immediate reproduction. The mites prefer insect hosts to other forms of food and within a month, a colony of 10,000 trillion mites may be born.

79-1008. Anonymous **Forest resource management.** *Chem. Can.* 31(1): 19-21; 1979.

The decision not to spray forests in Nova Scotia is seen as a mistake in forest management. The end result will be an increase in budworm destruction of the forests, which will cause either a reduction in harvesting by man, or a reduction in sustainability of forest. Since man will not likely be willing to settle for the unemployment growing out of a cut in harvesting of wood, the delayed result will more likely be a drastically depleted forest. Various plans are being developed to counter the loss of wood supplies. Strategies to salvage and stock pile wood, to harvest from non-infected areas, and to import wood from other areas are being considered. A silviculture program had been advanced for the purpose of increasing the growth rate of existing forests which will include cleaning and planting operations up to 50,000 acres per year for the next 40 years at a 5 million annual cost. The need for encouragement of public acceptance of the use of chemicals in the forestry industry is stressed.

79-1009. Hajjar, N. P. (Univ. California, Berkeley, CA) **Mechanism of the insecticidal action of diflubenzuron.** *Diss Abstr. Int. B* 39(8): 3676; 1979.

The present studies strongly support the hypothesis of diflubenzuron (DFB) action involving a direct metabolic block of chitin synthesis. These investigations were facilitated by a newly-developed *in vitro* model system that allows direct examination of DFB action on chitin biosynthesis. The conversion of [^{14}C]-glucose to ^{14}C-chitin proceeds rapidly in the isolated abdomens of adult *O. fasciatus*. After a lag period of a few minutes, there is good linearity for one hr between incubation time and ^{14}C-chitin content. The rate of chitin biosynthesis is maximal in abdomens from 12 hr old adults. Glucose and the aminosugars glucosamine and *N*-acetylglucosamine are rapidly absorbed by the epidermal cells and incorporated into chitin. DFB acts within minutes to inhibit chitin biosynthesis in the isolated adult abdomen system, and it has little if any effect on the transport within 20-60 min of glucose, glucosamine and *N*-acetylglucosamine into the abdominal cuticle. However, with *N*-acetylglucosamine as the substrate, there is a significant accumulation of ^{14}C-UDPAG as well as a significant decrease in ^{14}C-chitin. These findings indicate that DFB blocks a step in chitin biosynthesis beyond UDPAG, possibly chitin synthetase. There is a good correlation between the potency of 24 benzolyphenylureas as toxicants in the adult *O. fasciatus* abdomen system. This establishes that the site of action (receptor) for DFB in the cuticle is probably similar in nymphs and adults and that inhibition of chitin synthesis without hormonal mediation is likely to be the primary mode of action for all chemicals within this class. (Author abstract by permission, abridged)

79-1010. Barreuther, A. (Drug Inform./Poison Control, Arizona Health Sci. Cent., Tucson, AZ 85724) **Paraquat contaminated marijuana.** *Drug Intell. Clin. Pharm.* 13(1): 43; 1979. (3 references)

In a letter to the editor a response to the comments concerning the contamination of marijuana with paraquat points out that the information presented in a previous article seems to ignore the possibility of long term pulmonary damage from marijuana smoke itself. It is argued that the data presented for the treatment of paraquat toxicity was for a dosage of inhaled spray and not for inhaled smoke. This still leaves open to question the effects on humans of paraquat in

marijuana, and analytical methods for the determination of paraquat in marijuana smoke have so far been questionable.

79-1011. Wiley, M. L. (Author address not given) **Announcing *Estuaries*. Journal of the Estuarine Research Federation.** *Estuaries* 1(1):i; 1978.

The official journal of the Estuarine Research Federation (ERF), *Chesapeake Science* was transferred in ownership on October 5, 1977 from the University of Maryland to the ERF, and will now be published under the new journal title of *Estuaries*. *Estuaries* will include original papers of research in any aspect of natural science applied to estuaries, including biological, chemical, geological, and physical sciences. Abstracts of appropriate works that appear in *Estuaries* wil appear in future issues of *Pesticides Abstracts*.

79-1012. Goedde, H. W. (Inst. Humangenet., Univ. Hamburg, D-2000 Hamburg 54, BRD) **Oekogenetik. [Ecogenetics.]** *Fortschr. Med.* 97(4): 165-167; 1979. (8 references) (German)

Variable alcohol tolerance, inherited paraoxonase variants, carcinogenic disposition, predisposition for emphysema- bronchitis, intoxication after exposure to metals, and lactose intolerance are presented as examples for the diverse gene constitution within a certain population and betweeen different populations. Reference is also made to the mutagenic effect of drugs and chemicals (pesticides). It is suggested that individuals who display abnormal abilities to metabolize certain chemicals be given "pharmacogenetic I.D. cards" similar to the I.D. cards identifying blood groups or allergies. It is further indicated that certain references to drug intolerances, interaction possibilities, and intoxications by environmental poisons could be of importance to preventive and industrial-occupational medicine.

79-1013. Akulov, K. I. (Min. Public Health, Moscow, USSR) **Dal'neishii pod'em sel'skogo khoziaistva i zadachi gigienistov i sanitarnykh vrachei. [Further progress of Soviet agriculture, and tasks of environmental physiologists.]** *Gig. Sanit.* (11): 3-6; 1978. (Russian)

Tasks of environmental physiologists as outlined at the July 1978 Plenary Session of the Central Committee of the Soviet CP were discussed. Various social, economic, and cultural accomplishments of the Russian farmer were enumerated. Goals to reach and problems still to solve were listed. Among them are: how to mechanize animal and poultry husbandry without endangering the environment; physiological and sanitary conditions under which women work; storage, transportation and use of agricultural chemicals; and protein supplements and their effect on the consumer. Finally, a need for a greater number of environmental physiologists was stressed.

79-1014. Trakhtenberg, I. M.; Tychinin, V. A.; Verich, G. E.; Pasternak, G. A.; Blakita, I. V. (Inst. Occup. Dis., Kiev, USSR) **O nekotorykh printsipakh i metodicheskikh podkhodakh k eksperimental'nomu izuchenigu deistviya promyshlennikh yadov na serdtse i sosudy [Some principles and procedural approaches to an experimental study of industrial poisons on the heart and blood vessels.]** *Gig. Tr. Prof. Zabol.* (10): 12-15; 1978. (10 references) (Russian)

A literature survey is presented in which a correlation between the toxic effects of industrial toxins and clinical test results of cardiovascular function is found. Tests used in measuring the effects of thiols, antimetabolites, and anticholinesterases included multichannel electrocardiography, thermodilution, lateral rheology, and functional loading tests. In cases of suspected low-level toxicity, data from ECG (lead II), the systemic arterial pressure, and LDH and CPK values were suggested to be sufficient indicators of normal or abnormal cardiovascular function.

79-1015. Bababunmi, E. A. (Dep. Biochem., Sch. Med., Univ. Ibadan, Ibadan, Nigeria) **Toxins and carcinogens in the environment: an observation in the tropics.** *J. Toxicol. Environ. Health* 4(5/6): 691-699; 1978. (27 references)

The presence of toxic chemicals in foods and the environment of tropical African countries is discussed. Endogenous food toxins include hypoglycin, dioscorine, sapotoxin, cycasin, mushroom toxin, capsaicin (red pepper toxin), oxalic acid, cyanogen (prussic acid), fluorooleic acid, and *N*-nitroso compounds. Fungal toxin contaminants in foods include aflatoxins and palmotoxin. Foreign toxic chemicals are environmental contaminants including medicines, pesticides, and food additives. The incidence of primary liver cancers in these countries is the highest in the world, and there is growing belief that the high prevalence of carcinomas has a multiple chemical etiology from potentially carcinogenic products.

79-1016. Hardell, L. (Dep. Oncol., Univ. Hosp., S-90185 Umea, Sweden) **Malignant lymphoma of histiocytic type and exposure to phenoxyacetic acids or chlorophenols.** *Lancet* 1(8106): 55-56; 1979. (4 references)

In this letter to the editor a report is made on 17 men with malignant lymphomas of the histiocytic type. Of those questioned 11 reported occupational exposure to phenoxyacetic acids (MCPA, 2,4,5-T or 2,4-D) or chlorophenols for various lengths of time. Tumors were located in the neck, bladder, ileum, femur, groin/pelvic, mandible, or parotid regions. Their occupations, which were consistent with phenoxyacetic acid exposure, included farming/forestry, sawmill work, painting, and building trades. Chemicals of this type contain impurities such as dibenzodioxins and dibenzofurans. Dioxins (particularly TCDD) suppress cell-mediated immunity, and lymphomas of the histiocytic type are usually associated with recipients of immunosuppressive drugs following organ transplants. The relationship between these facts is suggested as an area needing further evaluation.

79-1017. Shearer, M. J.; Barkhan, P. (Dep. Hematol., Guy's Hosp., London SE1 9RT, England) **Vitamin K_1 and**

therapy of massive warfarin overdose. *Lancet* 1(8110): 266-267; 1979. (13 references)

In a letter to the editor, two hematologists point out that their previous work establishing the plasma clearance of labeled vitamin K_1 in humans has been incorrectly used to postulate the turnover-rate of the vitamin in humans. The doctors who used the plasma clearance value of 30-50%/hr to apply to a turnover rate were attempting to explain the short duration of action of vitamin K_1 in the body when it is used to counteract the anticoagulant effects of warfarin poisoning. In order to calculate turnover rate, several criteria must be satisfied. Meaurements of lipid-soluble radioactivity from the plasma must be specific. The authors point out interference in this measurement comes from radioactivity contributed by polar metabolites. The dose of injected vitamin must be small in relation to the total body pool. The system of vitamin K_1 elimination must be in a steady state such that the rapidly exchangeable pool remains constant. To monitor this, accurate measurements of vitamin K_1 levels in the blood would be required; however, no known method for determination of this vitamin in human blood has yet been reported. Also, the tracer dose must be mixed completely with the body pool in order to calculate the turnover-rate of vitamin K_1. This would require extensive time periods, the length of which are not known because the equilibration-times for vitamin K_1 in man have not yet been studied. The authors offer another explanation for the short duration of action of vitamin K_1 in cases of warfarin overdose, namely the interconversion of the vitamin to its 2,3-epoxide metabolite. Other research supports this theory that warfarin exerts its anticoagulant effect by inhibiting the regeneration of vitamin K_1 from its epoxide. This would also explain why an overdose of warfarin would require repeated administration of vitamin K to overcome failure to recycle the epoxide metabolite.

79-1018. Anonymous **New journal announcement.** *Mar. Environ. Res.* 1(1): 1-3; 1978.

The objectives and standards of the new publication *Marine Environmental Research* are outlined in this editorial. A clear definition of objectives and proper literature review are strongly urged of contributors prior to undertaking a research project. Investigative methods and techniques will be closely scrutinized, along with conclusions and interpretations based on the available data. Abstracts of pertinent articles from *Marine Environmental Research* will appear in the appropriate sections of *Pesticides Abstracts.*

79-1019. Lofgren, J. A.; Noetzel, D. M.; Harein, P. K.; Ascerno, M. E.; Cutkomp, L. K. (Agric. Extn. Serv., Univ. Minnesota, St. Paul, MN 55101) **Insecticdes.** *Mn. Agric. Extn. Serv. Extn. Bull.* 387: 3-19; 1978.

Insecticides continue to be needed in insect control programs. Safe and effective use of insecticides depends on knowledge of the characteristics of the pest species. General and specific precautions for safe use of pesticides are presented, including first aid measures, locations of poison control centers, suggestions for safeguarding honeybees, LD50 values for common insecticides, descriptions of forms of insecticides, formulas for calculating application rates, and individual descriptions of insecticides and miticides. These descriptions include the common name and trade name, principal formulation, principal uses, toxicity, and chemical name. Insecticides used in Minnesota include representatives of the chlorinated hydrocarbon, carbamate, organophosphate and miscellaneous classes.

79-1020. Manara, L.; Garattini, S. (Ist. Ric. Farmacol. "Mario Negri", Milan, Italy) **Seveso: premature optimism.** *Nature (London)* 276(5688): 556; 1978. (3 references)

In a letter to the editor comments on a report presented on the clinical features of the Seveso accident at the Seventh International Congress of Pharmacology in Paris are made. Hoffman-LaRoche's recent optimistic comments on the potential health risks to people living in the polluted area are criticized as unjustified. The statement made in Paris that chloracne after TCDD exposure shows a "quick healing tendency" implies, without supporting evidence, that this manifestation is quantitatively linked to exposure, and fails to mention its recurrence in people from widely scattered areas. Negative findings on health problems in the area were confidently interpreted as demonstrating a lack of TCDD induced pathology, with no criticism of the epidemiologic methods used. The Seveso case was not comparable to any previous accident, and therefore continuing close observation of inhabitants of the area is required. Excessively optimistic statements may make the inhabitants feel that they need not report for followup studies, thus further increasing the problem of lack of data.

79-1021. Reggiani, G. (Author address not given) **Seveso.** *Nature (London)* 277(5694): 260; 1979. (10 references)

In a letter to the editor, an employee of Hoffman-La Roche defends his position against accusations which state that he had underestimated the possible damage to human health caused by the Seveso incident. The author argues that his assessments of the consequences of the TCDD contamination were based on reports originating largely from the Epidemiological Medical Commission of the Lombardy Region in Milan. This commission, he points out, has handled the task of dermatological screening of over 32,000 schoolchildren with great skill and competence. About 5,000 people are still exposed to TCDD levels which may be potentially hazardous, and the author suggests protective measures to prevent further damage to this population be initiated.

79-1022. Agarwal, A. (Author address not given) **Pesticide poisoning-another Third World disease.** *New Sci.* 80(1134): 917; 1978.

Pesticide misuse throughout developing Third World countries is a major problem. Several cases of large-scale poisoning were directly attributable to the lack of knowledge of proper handling, mixing, and application of these products. The World Health Organization (WHO) Expert Committee

on Safe Use of Pesticides strongly recommends that developing countries start setting up control agencies for registering pesticides, educating farmers in their choice, use, and storage, and to evaluate needs of these products.

79-1023. Pimentel, D.; Goodman, N. (Dep. Entomol., Coll. Agric. & life Sci., Cornell Univ., Ithaca, NY) **Ecological basis for the management of insect populations.** *Oikos* 30(3): 422-437; 1978. (117 references)

In spite of the 4 billion lb of pesticides used in the world each year, global pre- and post-harvest losses of food to pests are estimated to be about 48%. Before an attempt can be made to control a pest, the ecology of the pest population must be known. Insect control techniques employ three basic methods: environmental, chemical, and genetic. The environmental insect control methods must take into consideration a number of factors that include pest population densities, species diversity, genetic diversity, introduction of new species into the community, climatic conditions, crop ecology and physiology, and pest-host interactions. Among the chemical methods are olfactory attractants, juvenile hormones, and insecticides. The genetic manipulation of populations offers a potentially powerful control method. The best hope of controlling insect populations lies in the combined, judicious use of the 3 basic methods tailored to the ecology of the pest species.

79-1024. Korte, F. (Inst. Chem., Tech. Univ. Munchen, D-8051 Freising, BRD) **Effects of pesticides and related compounds on the environment.** *Pure Appl. Chem.* 50(9-10): 1045-1061; 1978. (7 references)

Various parameters must be considered in establishing evaluation standards for pesticides and other chemicals. Some of these parameters include human toxicity, production and industrial waste, use patterns, dispersion pathways, persistence of the chemical in the environment, conversion of the chemical to other chemicals under biotic and abiotic conditions, and the effects on various non-target species. A distinction is made between local and global environmental chemicals. While the above mentioned chemical and physical factors can be evaluated, in theory at least, precisely, biological aspects which must also be considered are much more difficult to assess reliably. Direct action on man may be regarded as those effects resulting from the direct exposure of man to the chemical. Indirect interferences with man's health and well being may be considered to be effects of the chemical on components of the ecosystem. Various approaches have been developed with the aim of producing an effective screening system to protect the environment and its various segments from further harm. Above all other efforts, emphasis is placed on a pre-market screening of all new chemicals in regard to their potential for toxic and ecotoxic effects. A series of tests is being designed at present to supply information regarding the behavior of chemical substances under various conditions. Brief mention is made of the environmental specimen bank which will be a collection and storage center for a multitude of environmental samples known or suspected of accumulating pollutants.

79-1025. Maini, P.; Kovacs, A. I.; Lipparini, L. (SIAPA S.p.A. Div. R & S, Cent. Esp. Ric, I-40015 Galliera, Italy) **A new group of insecticides: synthetic pyrethroids.** *Rass. Chim.* 30(4): 233-247; 1978. (79 references) (Italian)

Because of a new orientation in the use of pesticides, the potential for synthetic pyrethroids is widening. This article recalls the properties and applications of the natural pyrethrins and their derivatives. This is followed by a recapitulation of the research (*cis-* and *trans-* isomers) which, over 3 decades, has resulted in the synthesis of 200 or so varieties of pyrethroids. The authors review the chemical and biochemical characteristics of pyrethroids and their biological action against household and agricultural pests (knockdown effect on the insect's nervous system). The toxicity, especially cutaneous toxicity, of these products remains low for humans, animals and plants. Consequently, the pyrethroids find their widest application in sprays and aerosols for domestic use. Unlike the short-lived pyrethrins, the newer synthetic formulations vanish from the environment after 2 to 4 wk, thus striking a balance between persistence and biodegradability. This makes them increasingly suitable for use in agricultural crops. However, there is still a scarcity of data about terminal pyrethroid residues other than those in the terrain and methods must be worked out for a general evaluation.

79-1026. Smith, R. J. (Author address not given) **Dioxins have been present since the advent of fire, says Dow.** *Science* 202(4373): 1166-1167; 1978.

The discovery of dioxins in fish from the river into which its effluent is discharged led the Dow Chemical Company to search for the source of the dioxins. Examination of numerous specimens revealed the presence of dioxins in a broad scope of combustion residues: ash from refuse incinerators, power plants, fireplaces, cigarettes and auto emissions. Ash from a power plant was hypothesized to be the source of the dioxins in fish, instead of the pesticide manufacturing process initially assumed to be responsible. The significance of this finding for human health is not clear; safe levels of dioxins have not been established. The dioxins found were mainly present in airborne particulates, while the principal threat for humans from dioxins is presumed to originate via the food chain. The levels of detection are in the ppt range. Regulatory agencies may argue that the further addition of dioxins to the environment is all the more undesirable in view of the unavoidable contamination.

79-1027. Mirvish, S. S. (Author address not given) **Structure-activity studies on *N*-nitroso compounds and their precursors.** In: *Structural Correlates of Carcinogenesis and Mutagenesis. Proc. Second FDA Office of Sci. Summer Symposium.* Asher, I. M., Zervos, C., eds. (FDA Office of Sci.: USA) pp. 158-162; 1977. (14 references)

Nitrosamines are formed by the reaction of nitrous acid with amides. Amides are present in the environment in the form of simple amides, ureas, and carbamates. The reaction is dependent on two different rate constants, that govern-

ing concentration (stoichiometric rate constant) and that concerned with the non-ionized amine and nitrous acid (true rate constant). The values for these rate constants along with other reaction parameters of p*Ka* and optimum pH are given for 15 secondary amines and one tertiary amine, and it is noted that the true rate constant is nearly the same for all of them. The pesticide piperazine exhibits a low true rate constant of 0.62 at a constant p*Ka* of 83.0 at 25°C. *N*-substituted amides and secondary amines are not the only reactants that are capable of forming *N*-nitroso derivatives. Experiments have shown that tertiary amines, and possibly even quaternary amines can yield the nitrosamine and an aldehyde. Nitrosation by nitrogen oxide gases, and by nitrous acid extracted from acidified solutions of nitrite into methylene chloride have also been achieved. The reaction yields, reaction time, and initial nitrite requirements of the latter method of nitrosation are listed for the pesticide carbaryl, and other compounds. The ability of the test compounds to induce lung adenomas in Swiss mice was studied by administering the compounds in drinking water or food. Morpholine, piperazine, and methylaniline given along with $NaNO_2$ induced adenomas, but dimethylamine did not. This was found to correlate with the results of the kinetic data on dimethylamine which showed that this compound is slowly nitrosated.

79-1028. Diaz-Colon, J. D.; Bovey, R. W. (ARS, USDA, College Station, TX 77847) **Selected bibliography of the phenoxy herbicides. III. Toxicological studies in animals.** *Tex. Agric. Exp. Stn. Misc. Publ.* 1343: 1-105; 1977. (871 references)

The first two bibliographies published by this working group on the phenoxy herbicides covered the aspects of environmental fate and contamination with substituted dibenzo- *p*-dioxins. This third section lists publications on toxicity, including research papers on experimental animals, domestic animals, wildlife, and man, arranged by chemical, type of effect, and animal species. Other technical literature, of an informative nature but not constituting research reports, is also cited, as are reports on governmental and legal actions pertaining to the toxic effects of phenoxy herbicides. Review articles are also cited.

79-1029. Skaftason, J. F.; Johannesson, T. (Dep. Pharmacol., Univ. Iceland, Reykjavik, Iceland) **Organochlorine compounds (DDT, hexachlorocyclohexane, hexachlorobenzene) in Icelandic animal body fat and butter fat: local and global sources of contamination.** *Acta Pharmacol. Toxicol.* 44(2): 156-157; 1979. (9 references)

Thirty-five samples of butter were taken during the period 1968 to 1970 from the six largest dairies in Iceland. The mean values of certain pesticides detected as residues in these butter samples were: α-BHC, 87 ng/g; dieldrin, 12 ng/g; DDE, 14 ng/g; lindane, 13 ng/g; DDT, 18 ng/g; and DDD (TDE), 12 ng/g. There was an obvious tendency towards lower values in 1970 than in the 1968 and 1969 samples, especially for lindane. The work was continued during the years 1974 through 1978 with mean values in ng/g for α -BHC, 58; for lindane, 7; for β-BHC, 23; and for DDE, around 5. In analyses of 24 samples of reindeer fat, α-BHC was detected in all samples, whereas the amounts of all other substances referred to were below detection limits. HCB (hexachlorobenzene) was present in variable amounts in all samples, as were PCB's. It is suggested that the α-BHC found in wild reindeer and moose may be due to widespread contamination by this substance.

79-1030. Morse, D. L.; Baker, E. L.; Landrigan, P. J. (Spec. Stud. Branch, Chron. Dis. Div., Bur. Epidemiol., CDC, US PHS, Atlanta, GA 30333) **Cut flowers: a potential pesticide hazard.** *Am. J. Public Health* 69(1): 53-56; 1979. (9 references)

On 3 dates in January, 1977, in Miami, Florida, 105 lots of imported cut flowers (carnations, pompom chrysanthemum, and standard chrysanthemums) were sampled for pesticide contamination. Sixteen pesticides of varying toxicity were detected; endosulfan, diazinon, and phosphamidon occurred most frequently. Azodrin (monocrotophos) was the most significant contaminant, which is a moderately toxic organophosphate, found in 9 of the contaminated lots. High residue levels, greater than 5 ppm, were found in flowers from 17 of the 43 growers, 16 from Columbia and 1 from Guatemala. Studies were conducted on 20 flower inspectors and 12 commercial florists who were exposed to the contaminated flowers. Occational nonspecific symptoms which are compatible with possible organophosphate exposure were noted. However, no abnormalities were found in plasma or red blood cell cholinesterase levels.

79-1031. Dorn, P.; Knoeppler, H. O. (Tiergesundheitsdienst Bayern, Post Poing, BRD) **Rueckstandsuntersuchungen auf chlorierte Kohlenwasserstoffe und Umweltchemikalien an Eiern und Gefluegelfleisch. [Investigations of chlorinated hydrocarbon residues and environmental chemicals in eggs and poultry-meat.]** *Berl. Muench. Tieraerztl. Wochenschr.* 90(7): 137-140; 1977. (24 references) (German)

A total of 970 egg samples (1 sample = 30 eggs), 286 broiler, 132 chicken, and 73 turkey meat samples (1 sample = cumulated fat of 15 animals) were investigated for chlorinated hydrocarbons, 970 egg and 286 liver samples of broilers were examined for arsenic, and 161 egg samples were examined for residues of lead, cadmium and mercury. In the egg samples, 0.21% (2 samples) of the hexachlorobenzene values and 0.1% (1 sample) of the heptachlor epoxide values exceeded the legally permissible maximums of 0.3 and 0.05 mg/kg, respectively. In the chicken samples, 2.27% (3 samples) of the hexachlorbenzene values and 1.52% (2 samples) of the lindane values exceeded the threshold values of 0.5 and 0.7 mg/kg, respectively. In the broiler and turkey samples, all pesticide levels were below the threshold. The arsenic tolerance levels were exceeded in 16 of the egg samples and in 2 of the broiler liver samples. Lead, cadmium, and mercury limit values were exceeded in both egg and liver samples. A suggestion is made for review of the present tolerance for the heavy metals.

79-1032. Ueji, M.; Kanazawa, J. (Natl. Inst. Agric. Sci., Kita-Ku, Tokyo 114, Japan) **Degradation of *o-sec*-butylphenyl *N*-methylcarbamate (BPMC) in soil.** *Bull. Environ. Contam. Toxicol.* 21(1-2): 29-36; 1979. (18 references)

Experiments were conducted to study the degradation of the pesticide BPMC in three types of rice paddy fields in Japan. Technical grade *o-sec*-Butylphenyl *N*-methylcarbamate (BPMC) at concentrations of 0.2, 1.0 and 10 0 ppm was applied to the soils and incubated at 28°C for 50-60 days. The effect of moisture and bacteriocides was determined. Results indicated that the most concentrated solution had the slowest degradation time. Variations in water content of the soils affected breakdown; the lower the water content, the slower the breakdown. The addition of sodium azide reduced the breakdown time of the pesticide, suggesting microbial degradation.

79-1033. Elfving, D. C.; Stehn, R. A.; Pakkala, I. S.; Lisk, D. J. (Dep. Pomol., New York Coll. Agric. & Life Sci., Conrell Univ., Ithaca, NY 14853) **Arsenic content of small mammals indigenous to old orchard soils.** *Bull. Environ. Contam. Toxicol.* 21(1-2): 62-64; 1979. (11 references)

Since soils can concentrate arsenic from past sprayings of pesticides, studies were performed to determine the arsenic content of small animals indigenous to an old orchard in which this compound was sprayed over a period of time. Animals, including several species of vole and mouse, were trapped, killed, washed and analyzed for arsenic. Arsenic content was as high as 28 μg/total body content and as low as 1.2 μg. About 80% of the absorbed chemical is stored. Histopathological studies were not performed, nor were studies to determine the bioaccumulation rates in carnivores feeding on the small animals studied.

79-1034. Zabik, M. E.; Hoojjat, P.; Weaver, C. M. (Dep. Food Sci. & Hum. Nutr., Michigan State Univ., East Lansing, MI 48824) **Polychlorinated biphenyls, dieldrin and DDT in lake trout cooked by broiling, roasting, or microwave.** *Bull. Environ. Contam. Toxicol.* 21(1-2): 136-143; 1979. (7 references)

To determine the effects of cooking on the disappear-

ance of pesticides, trout obtained from Lake Michigan were analyzed. Right sides of filleted fish were analyzed raw for PCB's dieldrin, and DDT. The left side fillets were cut into three pieces; one piece was broiled, one was cooked by microwave, and one was roasted. Pieces were roasted with and without the skin. Cooking significantly reduced PCB's, dieldrin and DDT in the fish. Losses of PCBs ranged from 26-70%, dieldrin from 25-57%, and DDT from 30-57%. The greastest loss occurred when fish were broiled or roasted without the skin.

79-1035. Jackson, M. D.; Lewis, R. G. (Health Eff. Res. Lab., US EPA, Research Triangle Park, NC 27711) **Volatilization of methyl parathion from fields treated with microencapsulated and emulsifiable concentrate formulations.** *Bull. Environ. Contam. Toxicol.* 21(1-2): 202-205; 1979. (4 references)

Studies were performed to determine which form of methyl parathion, micro-encapsulated (ENCAP) or conventional emulsifiable concentrate (EC), vaporized more rapidly after being applied to separate tobacco fields. An air sampler was placed near the treated plants. Filter pads from the samplers were soxhlet-extracted with ethyl acetate. Extractions were concentrated and analyzed by gas chromatography. On the day of spraying, about twice the level of EC was found than that of ENCAP. On the day after spraying, there was ten times as much EC as ENCAP. On day 3, there was five times as much EC as ENCAP in the air. By the ninth day, the levels of each formulation were nearly equal.

79-1036. Lee, V. A.; Lorenz, K. (Dep. Food Sci. & Nutr., Colorado State Univ., Fort Collins, CO) **The nutritional and physiological impact of milk in human nutrition.** *CRC Crit. Rev. Food Sci. Nutr.* 11(1): 42-116; 1978. (414 references)

The possible benefits and hazards of milk consumption are reviewed. Milk contains high levels of protein, calcium, riboflavin and vitamin A, and if fortified, vitamin D. Milk is a significant source of calcium in the diets of growing children. On the other hand, milk contributes to the saturated fat and cholesterol content in the diet and has been implicated as a possible cause of high incidence of atherosclerosis in developed countries. In Caucasian populations there is a problem of lactose intolerance in some adults. Although the level of contaminants allowable in milk has been strictly regulated, there have been incidents of high levels of chemical contamination by pesticides in some milk samples, especially by the organochlorine insecticides, heptachlor epoxide, aldrin, dieldrin, endrin, heptachlor, methoxychlor, and the organophosphorus insecticides, diazinon, malathion, parathion, demeton, and dimethoate. Most contamination by pesticides is eliminated from the milk during routine processing procedures.

79-1037. Ku, C. C. (Rutgers Univ., New Brunswick, NJ) **Fate of mephosfolan in a simulated rice paddy ecosystem.** *Diss. Abstr. Int. B* 39(7): 3224-3225; 1979.

The metabolic fate of mephosfolan, a systemic insecticide, was studied in a simultated rice paddy ecosystem. Approximately 50% of the applied insecticide was taken up by the rice plant, 25% remained in the soil, 20% was converted to carbon dioxide and the remainder was divided between the paddy water and resident fish. Of the material found in the rice plant, approximately 45% was due to mephosfolan, 5% to a total of 17 extractable metabolites and the remainder became incorporated into plant cellulose, lignin and starch. No mephosfolan was found in the rice grain. Numerous metabolites were found in the fish with very little mephosfolan present. In a separate study, the photolysis of mephosfolan by sunlight was investigated in distilled water, rice paddy water, and a 2% acetone solution. The rate of photolysis was slowest in distilled water and fastest in 2% acetone; although the major photoproducts were qualitatively similar in the three systems. Numerous photoproducts were determined and a mechanism is proposed. (Author abstract by permission. Copies of the thesis available from University Microfilms, order no. 7901281)

79-1038. Nigg, H. N.; Allen, J. C. (Agric. Res. & Educ. Cent., Inst. Food & Agric. Sci., Univ. Florida, Lake Alfred, FL 33850) **A comparison of time and time-weather models for predicting parathion disappearance under California conditions.** *Environ. Sci. Technol.* 13(2): 231-233; 1979. (9 references)

Time and time-weather models for predicting parathion disappearance on California Valencia foliage were compared. The time-based first-order disappearance model explained 67% of the residue data variation for 7 dilute application experiments and 55% of the residue data variation for 7 low-volume experiments. The time-weather first-order disappearance model considerably improved predictive accuracy to 83% for both experimental series. Utilization of pesticide disappearance models which incorporate weather conditions is suggested for harvest-time and worker reentry regulations and for reducing dependence on environmental monitoring studies. (Author abstract reprinted by permission of the American Chemical Society.)

79-1039. Buss, D. H.; Lindsay, D. G. (Food Sci. Div., Minist. Agric. Fish. & Food, London SW1P 2AE, England) **Reorganization of the UK total diet study for monitoring minor constituents of food.** *Food Cosmet. Toxicol.* 16(6): 597-600; 1978. (15 references)

To estimate average intakes of food constituents from total diet studies, representative amounts of key foods are obtained throughout the country. The food samples are prepared and cooked (if necessary) as for eating and then grouped for chemical analysis. The British study developed in 1966 for estimating pesticides intakes has been modified to improve its usefulness for estimating the intake of heavy metals and other food constituents, and simplified by reducing the number of foods from 78 to 68 and by eliminating most seasonal and regional differences in food purchases. The quantities of food have been updated and coverage has been

extended to the whole of the United Kingdom. (Author abstract by permission)

79-1040. Heuss, K. (Landesanstl. Wasser Abfall Nordrhein-Westfalen, Am Waldwinkel 70, BRD) **Auswirkungen des Einsatzes von Herbiziden auf Oberflaechengewaesser. [Consequences of herbicide additions to surface waters.]** *Forsch. Berat. Reihe C* 30: 189-204; 1976. (14 references) (German)

Physical-chemical changes in waters after herbicide application, the short- and long-term effects of amitrol, paraquat, terbutryn, dichlobenil and dalapon on water biocenosis (bacteria, protists, fish food supply, and fishes) and possibilities of biological control of aquatic weeds are outlined. The toxicity of dichlobenil, paraquat and dalapon on warm-blooded animals, fishes and fish food sources is given in a table. Another table shows the effects of a 3-year long amitrol and terbutryn application on the ciliate community in a marshland ditch.

79-1041. Spiny, E. I. (All-Union Sci. Res. Inst. Toxicol. Pestic. Polymers & Plast., Kiev, USSR) **O roli eksperimental'nykh gigienicheskikh issledovanii v prognoze povedeniia pestitsidov v okruzhayushchei srede. [Use of experimental hygienic studies in predicting the behaviour of pesticides in the environment.]** *Gig. Sanit.* 43(11): 6-9; 1978. (7 references) (Russian)

An experimental model for use in predicting the behavior of pesticides in the environment is evaluated. Based on the available literature, mobility and stability of pesticides were considered to be key indices of pesticide behavior. Various characteristics of stability, such as the rate of disintegration and the factors involved in that process were elaborated upon. Mobility of pesticides, the reaction of many pesticide properties, the environment, and the modes of pesticide application were discussed. A need for a unified system of indices, which would show not only the amount of pesticides in the environment and the character of their mobility, but also their resistance, separation factors in various systems, and the rate of coefficient of direct and reverse migration in the ecosystem was stressed. Additionaly, a need for a method to set-up the experimental model so that it could be translated into the real life situation to predict the behavior of pesticides was emphasized.

79-1042. Petrovskii, K. S. (Author address not given) **Okhrana vnutrennei sredy - osnova profilaktiki boleznei. [Protecting the human body - basis for the prevention of disease.]** *Gig. Sanit.* 43(11): 43-47; 1978. (Russian)

Various aspects of intoxication were discussed. Chronic alcoholism, smoking, food and drink additives, and polypharmacy were elaborated upon. Data on DDT concentration in fatty tissue and in the milk in humans in various countries were given. Different problems connected with the above mentioned forms of intoxication were mentioned and some well known solutions recommended.

79-1043. Velev, B.; Rankov, V. (Sci. Res. Inst. Veg. Growing, Plovdiv, Bulgaria) **Vliyanie na nyakoi kherbitsidni smesi v'rkhu plevelite i dobiva ot bezrazsadni domati i biologichnata aktivnost na pochvata. [Effect of some herbicides mixtures on weeds, the yields of untransplanted tomato, and the biological activity of soil.]** *Gradinar. Lozar. Nauka* 14(6): 46-51; 1977. (8 references) (Bulgarian)

The effect of some herbicide mixtures on weeds, the yields of untransplanted tomato, and the biological activity of soil were studied for 2 yr in an alluvial-meadow soil with low humus content (1.5%) and pH 6.9-7.1. The herbicides were applied only once 10-12 day before planting-time. Mixtures of napropamid (1 kg/ha) or difenamid (1.6-3.2 kg/ha) in combination with metribuzin (1.75 kg/ha) produced satisfactory yields, good selectively of the crop, and a herbicidal effect on the mono- and dicotyledonous weeds. The mixtures produced neither substantial nor durable changes in the biological activity of the soil. A slight inhibitory effect was observed after the treatment with a mixture of napropamid (1 kg/ha) and metribuzin (1.75 kg/ha). The effect was greater in the 0-10 cm soil layer 50 days after treatment.

79-1044. Cocisiu, M.; Nistor, C.; Aizicovici, H.; Boros, F.; Hirtescu, E.; Mindroiu, V.; Pencescu, E. (Inst. Ig. Sanat. Publica, Iasi, Rumania) **Studiu asupra ingestiei de pesticide organoclorurate prin alimentatie la citeva colectivitati organizate din Moldova. [Studies on ingestion of organochlorine pesticides with foodstuff in some organized communities in Moldavia.]** *Igiena* 27(3): 251-254; 1978. (11 references) (Rumanian)

A total of 360 complete daily food rations in Moldavia, Romania, were analyzed for organochlorine pesticide residues. The highest median values (yearly averages) were 0.33 mg/day for total DDT, and 0.84 mg/day for HCH (BHC). The lowest daily intakes were 0.04 mg/day for DDT and 0.11 mg/day for HCH. The median daily intake was 0.108 mg/day for DDT and 0.206 mg/day for HCH. These levels are about 2.5 times lower than the maximum allowable daily intake for the respective pesticides. Considering, however, that about 10% of the samples contained large amounts of residues than the acceptable daily intake, permanent monitoring of pesticide use in agriculture is suggested.

79-1045. Anonymous **Food and environmental pollution by pesticides.** *Ig. Sanita Pubblica* 34 (7-8): 250-251; 1978. (Italian)

At a food information seminar in Padua, Italy, one of the main topics of discussion was the link between pesticides and the pollution of food originating from animals. Chlorinated pesticides present the greatest problem because their polluting power is directly related to their stability and persistency (DDT). Of residues in the human body 0.9 come from food and half of that from animal fats. The possible carcinogenic action of some of these products was mentioned. Another subject of discussion was the widespread utilization of chlorinated substances as agricultural pesticides in underdeveloped nations. A curtailment in the use of these products

would bring about economic difficulties (loss of crops) or sanitary problems (resurgence of malaria) in many areas. A distinction must be made between countries which need these insecticides and countries where their use can be reduced.

79-1046. Maggi, E.; Dazzi, G.; Madarena, G. (Inst. Isp. Aliment. Orig. Anim., Univ. Parma, Parma, Italy) **Determination of chlorinated pesticide residues in pork meat products.** *Ind. Conserve* 53(3): 179-190; 1978. (36 references) (Italian)

This study seeks to determine the presence of chlorinated pesticide residues in pork meat products sold in delicatessens in Italy. Despite the relatively low toxicity and because of their stability and durability, chlorinated pesticides may play an insidious role in the food chain and tend to accumulate in the human body. Meats, and especially pork, due to its high lipid content, seem to be good vehicles for retaining these substances. The authors describe the techniques used to extract, purify and analyze (by gas chromatography) samples of pork meat products gathered over a year's time. Fourteen tables show the contents (ppb) of BHC, DDT and chlorocyclodienes observed in each category of cooked or uncooked meat. It was found that, like beef, a lower fat content in some pork products corresponds to a lower amount of chlorinated pesticide residues. There was no difference in cooked or uncooked pork products of residues of DDT and its metabolites. Since pork products are an important part of the Italian diet and the degree of pesticide contamination is higher than in beef, they must be considered a significant source of pesticide intake in the diet.

79-1047. Freudenthal, J. (G. J. ten Hove Natl. Inst. Public Health, Bilthoven, The Netherlands) **The detection and identification of unknown halogenated compounds in environmental samples.** *Int. J. Environ. Anal. Chem.* 5(4): 311-321; 1978. (8 references)

The use of mass spectrometry with an element specific detector, as well as regular mass spectrometry used for identification of unknown compound, are described. The method was used to study surface water of the Rhine River, the fat of a great crested grebe, and human adipose tissue for the content of various chemicals. Samples of human adipose tissue were shown to be contaminated with various common chlorinated pesticides such as β-BHC, HCB (hexachlorobenzene), TDE, and DDE. Rhine River water contained β-BHC, HCB, DDE, dieldrin, TDE, and p,p'-DDT. The fat of the great crested grebe contained β-BHC, HCB, DDE, dieldrin, and TDE.

79-1048. Leistra, M. (Lab. Res. Insectic., Wageningen, The Netherlands) **Evaluation of rate coefficients for consecutive reactions of pesticides in soil.** *J. Environ. Sci. Health B* 13(4): 343-360; 1978. (12 references)

A computation model was used to derive approximate values for first order rate coefficients from measured concentration-time relationships reported in the literature for aldicarb, disulfoton, and phorate. Starting points were the concentrations measured at intervals after incorporation of the pesticides in the soil. These compounds were partly oxidized to their respective sulfoxides, which were in turn partly oxidized to the sulfones. For some of the experiments, good descriptions of the concentration-time relationships could be obtained, and so the corresponding rate coefficients could be derived. In other cases the measuring period was too short to evaluate the rate coefficients for the sulfone. Lack of recovery percentages for conversion products and of checks on transformations during analysis was an obstacles in the quantitative evaluation of rate coefficients.

79-1049. Frank, R.; Braun, H. E.; Holdrinet, M.; Sirons, G. J.; Smith, E. H.; Dixin, D. W. (Prov. Pestic. Residue Test. Lab., Ont. Min. Food & Agric. Guelph, Ont. N1G2WI, Canada) **Organochlorine insecticides and industrial pollutants in the milk supply of southern Ontario, Canada - 1977.** *J. Food Prot.* 42(1): 31-37; 1979. (12 references)

Samples of milk were taken from 308 bulk transporters hauling milk from 11 southern Ontario counties. These samples were analyzed for residues of diphenylethanes, cyclodienes, lindane, mirex, and polychlorinated biphenyls. Residues of hexachlorobenzene were also monitored. Over 95% of the samples contained measurable amounts of p,p'-DDE, dieldrin, heptachlor epoxide and PCB, and about two-thirds contained detectable levels of HCB. Only about one-sixth of the samples contained p,p'-DDT and p,p'-TDE. Three individual case histories of accidental application of endrin, lindane, or fenthion as topical treatments for insect control of dairy cattly were also studied. Residues appeared almost immediately in the milk and shipments.

79-1050. Mori, Z.; Tamura, J. (Wakayama Res. Lab., Kao Soap Co., Wakayama, Japan) **[Application of detergent containing sugar fatty acid ester and potassium pyrophosphate to industrial usage.]** *Eiyo Shokuryo Gakkaishi (J. Jpn. Soc. Food Nutr.)* 31(4): 333-339; 1978. (11 references) (Japanese)

It has been shown in previous studies that the Bordeaux mixture used on tomatoes was efficiently removed by washing with a detergent containing sugar fatty acid ester and potassium pyrophosphate. The scale-up of the washing test in the laboratory, and the use of an air-bubbling system, as well as the durability and foaming power of the washing solution, detergent residues in rinsed tomatoes, and the removal of detergent wash effluent at a tomato processing plant have been investigated. In addition to favorable results obtained from the tests above, copper and arsenical residues on grapes were also removed very efficiently by washing with the detergent and HCl, followed by washing with NaOH. For removal of phenthoate residues on Satsuma mandarins, it was discovered that the mechanical factor of brushing and the chemical factors of the detergent contributed equally to the residue removal.

79-1051. Mueller, R.; Lingens, F. (Inst. Mikrobiol., Univ. Hohenheim, D-7000 Stuttgart 70, BRD) **Synthese einer Mo-**

dellverbindung zur Untersuchung des mikrobiellen Abbaus von 5-Amino-4-chlor-2-phenyl-3(2*H*)-pyridazinon. [Synthesis of a model compound for the investigation of the microbial decomposition of 5-amino-4-chlor-2-phenyl-3(*2H*)-pyridazinone.] *Justus Liebigs Ann. Chem.* (11): 1734-1738; 1978. (6 references) (German)

The synthesis of isopropyl 2-acetoxy -6- (2,3-dimethyl- 5-oxo-3-pyrazolin-1-yl)-6-oxo- *trans*-2,*trans*-4- hexadienoate by way of four intermediate stages is described. The stages are: potash salt of 2-hydroxymuconic acid -1-isopropyl -6- methyl ester; 2-hydroxymuconic acid- 1-isopropyl ester; 2-acetoxymuconic acid -1- isopropyl ester; and 2-acetoxymuconic acid- 1-isopropyl ester -6- chloride. Based on the hypothesis of the decomposition mechanism of 5-amino-4-chloro-2-phenyl-3(2*H*)- pyridazinone, which is the selective beet herbicide "Chloridazon", it is possible to split isopropyl 2-acetoxy-6-(2,3-dimethyl- 5-oxo-3- pyrazolin-1-yl) 6-oxo-*trans*-2,*trans*-4- hexadienoate into 2-acetoxymuconic acid-1-isopropyl ester and a free heterocyclus by an enzyme (amidase) of 5-amino-4-chloro-2-phenyl-3(2*H*)-pyridazinon decomposing bacteria.

79-1052. Protasov, N. I.; Gavrilova, A. N. (Byeloruss. Agric. Acad. Gorki, Mogilev, USSR) **Izmenenie aktivnosti pochvennykh fermentov pod deistviem gerbitsidov [Activity of soil enzymes after treatment with herbicides.]** *Khim. Sel'sk. Khoz.* 16(8): 72-76; 1978. (17 references) (Russian)

The effect of herbicides on the activity of hydrolic enzymes was studied for three yr. *S*-Triazines, urea derivatives, and phenyl carbamates (400 l/ha) were hand sprayed over 50 m² size sections of mountain soddy podzolic soil. The activity of phosphatase, urease, and invertase were considered, and the data collected 10, 30, and 60 days after the treatment were analyzed by the dispersion technique. The greatest effect of the herbicides on the biochemical processes was observed during the initial period. The urea derivatives had the strongest effect on the activity of soil enzymes. *S* -Triazines and phenyl carbamates had a considerable effect only in high dosages. The mineralization of phosphorus compounds and the activity of invertase in the soil were strong only initially. High dosages of herbicides intensified the activity of phosphatase throughout the vegetation period, while low doses had an effect only initially.

79-1053. Kovaleva, E. S.; Talanov, G. A. (Author address not given) **Ostatochnye kolichestva sevina v rasteniyakh i pochve. [Residues of carbaryl in plants and soil.]** *Khim. Sel'sk. Khoz.* 16(8): 77-79; 1978. (8 references) (Russian)

Residues of carbaryl (C) in soil and food crops, the degree of absorption of the compound by the root system of plants, and the migration of the pesticide into the leaf and fruit were studied. Corn, beet, potato, and oat mixtures were treated with C in four variations: (1) C (2.5 kg/ha/application, 85% moistened compound) applied to shoots twice; (2) C (5 kg/ha) sprayed following the aftergrowing; (3) C(5 kg/ha) applied 1 day before seeding; and (4) C (19 kg/ha). Thin-layer chromatography was used to determine the amount of residue. The level of residues of C was negligable in (1). In (2) and (3) the maximum amounts of C in parts of the plants above ground were 5.5, 4.5 and 2.5 mg/kg at 10, 20 and 30 days, respectively. The toxin remined in the soil up to 15 mo. It was then absorbed by the roots and then it migrated into the leaf and fruit. However, the levels of C residues in plants was low.

79-1054. Bidnenko, L. I. (Author address not given) **Ostatochnye kolichestvagerbitsidov v sakharnoi svekle i pochve. [Herbicide residues in sugar beet and soil.** *Khim. Sel'sk. Khoz.* 16(10): 77-78; 1978. (2 references) (Russian)

The results of determinations of herbicide residues in sugar beet and soil are presented. The herbicides (Eptam: 75% emulsified concentrate, 3-4 kg/ha; Ronit (cycloate): 72% emulsified concentrate, 3-6 kg/ha; Piramine: 60% wettable powder, 4 kg/ha; sodium trichloroacetate (TCA): 90% soluble powder, 10-12 kg/ha; and Betanal (phenmedipham), 15.9% emulsified concentrate, 6-8 kg/ha) were applied alone or in combination. The residues were assessed by thin-layer chromatography and spectrophotometry. The herbicides were found to be mildly persistent; duration of complete degradation in the soil did not exceed 6 mo. In sugar beet only Piramine (traces), Ronit (traces) and Betanal (0.1 mg/kg, compared with permissible concentration of 0.2 mg/kg) were detected.

79-1055. Veselovskii, I. V.; Kariamo, Kh.; Samosvat, L. S. (Ukr. Agric. Acad., Kiev, USSR) **Ostatki sutana v pochve i rasteniiakh kukuruzy i posledeistvie ego na zernovye kul'tury. [Sutan residues in soil and corn plants and its aftereffect on grain crops.]** *Khim. Sel'sk. Khoz.* 16(11): 32-34; 1978. (5 references) (Russian)

The results of determinations of herbicide Sutan (butylate) residues in soil and maize, conducted between 1975 and 1977, are presented. Sutan could not be detected in upper layers of the soil 120 days after application at the rate of 4 kg/ha (a.i.); after appliction at a rate of 8 kg/ha, insignificant amounts of herbicide were detected in the surface layer (0-20 cm). Determination of Sutan residues in maize indicated that herbicide undergoes rapid degradation in the stem and leaves and accumulates primarily in the roots. Sutan residues in corn grain comprized 0.02-0.04 mg/kg after application at 4 kg/ha and 0.1-0.16 mg/kg after application at 8 kg/ha. Application of Sutan at rates of 4-8 kg/ha had no carryover to barley and wheat seeded the year after maize treatment. Sutan in combination with atrazine (at rates of 3 kg/ha) inhibited germination of barley and wheat, and, thus, decreased the yield.

79-1056. Olafson, R. W. (Aust. Inst. Mar. Sci., Cape Ferguson, Queensland, Australia) **Effect of agricultural activity on levels of organochlorine pesticides in hand corals, fish and molluscs from the Great Barrier Reef.** *Mar. Environ. Res.* 1(2): 87-107; 1978. (20 references)

Corals (*Fungia* and *Acropora* spp.), bivalve molluscs (*Triadacna*) and two species of fish (*Plectopoma maculatum* and *Scarus fasciatus*) were collected from The Great Barrier Reef System of Australia. Tissues of the animals were analyzed for pesticide contents, particularly for highly toxic organochlorine compounds. Only lindane was found in appreciable quantities in the species analyzed. Samples from 20 reefs varied in lindane concentration 0.01-0.39 ng/g wet weight in *Acropora*; 0.02-0.92 ng/g in *Fungia*; 0.0-0.47 ng/g in *P. maculatum* flesh; and 0.0-13.31 ng/g in *S. fasciatus* livers. Other residues detected in some samples were DDE, DDT, heptachlor epoxide, and dieldrin. Evidence that lindane was being transported from the sugar-cane growing regions of the mainland was derived from north-south plots of lindane concentrations in samples. Consideration is given to the possible mode of transport of lindane from agricultural areas to the reef environment.

79-1057. Anonymous **IV. Mitteilungen aus der Laboratoriumspraxis (Auszuge aus den Jahresberichten amtlicher Laboratorien. [IV. Communications on laboratory analyses. (Excerpts from the annual reports of official laboratories.)]** *Mitt. Geb. Lebensmittelunters. Hyg.* 69(3): 378-393; 1978. (German)

The results of pesticide residue analyses performed by official laboratories in Switzerland are presented. The hexachlorobenzene, total BHC and total DDT levels found in milk averaged 0.001 ppm. The residue levels found in butter averaged 0.045 ppm for total BHC, 0.02 ppm for hexachlorobenzene, 0.015 ppm for dieldrin, and 0.025 ppm for DDT and its metabolites. Diazinon, malathion, and bromophos methyl were found in vegetable oils. Phenchlorvos (ronnel) residues averaging 11.1 ppm were found in 19/22 dietetic food samples. Total BHC levels of 0.01-0.06 ppm and total DDT levels of 0.001-1.31 ppm were found in grapes imported from Italy. Tolerable dithiocarbamate residues levels were found in 31/67 lettuce samples, non-tolerable residue levels occurred in 21. BHC, DDT, Ultracide (methidathion), parathion, diazinon, dicofol, malathion, dimethoate and bromophos were found in some tea and spice samples. Some cigarette tobacco samples contained alpha-BHC, lindane, beta-BHC, dieldrin, DDT, DDD (TDE), *p,p'*-DDT, *p,p'*-DDT, or α--endosulfan. α-BHC (0.004-0.035 ppm), β-BHC (0.006-0.012 ppm), lindane (0.004-0.020 ppm), δ-BHC (0.001-0.012 ppm), hexachlorobenzene (0.002-0.083 ppm), metathion (0.07-0.08 ppm) and diazinon (0.03-0.19 ppm) were found in Rhine water samples.

79-1058. Anonymous **Paraquat contamination of marijuana - United States.** *Morbidity Mortality Weekly Report* 28(8): 93-94; 1979. (2 references)

In 1977 and 1978, concern arose in the US that residues of paraquat in marijuana from Mexico could present a health hazard to users. In November, 1978 a nationwide marijuana testing program was initiated by the CDC to gather quantitative data on regional prevalence and degree of paraquat contamination of marijuana. Confiscated marijuana samples were analyzed by HPLC. It was assumed that all marijuana confiscated in 1 seizure was from the same original source, and that the sample analyzed was representative of the entire stock of the seizure. Nationally, 33 of the 910 seizures (3.6%) or 1059 of the 168,424 kg confiscated (0.63%) were found to be contaminated with paraquat. Of the total weight of contaminated marijuana, 98.6% was confiscated from New Mexico, Texas, Oklahoma, Arizona, and Louisiana. No contamination was found in samples from Eastern Seaboard or Pacific Northwest states. Paraquat levels in the 33 contaminated seizures ranged from 10 to 461 ppm, with 22 of these samples containing less than 100 ppm of paraquat. Only 2 of the 33 contaminated seizures contained levels of paraquat greater than 400 ppm. Eighty-nine of the seizures were known to originate in Mexico, and 11 of these were contaminated with paraquat.

79-1059. Richter, M. (VEB Wissensch. & Tech. Tabakind., DDR-8021 Dresden, DDR) **Ueber die Untersuchung von Organochlor-Insktizidrueckstaenden in Tabak und Tabakwaren. 2. Mitt. Rueckstandsmengen der in der DDR verarbeitetn Rohtabake. [On the study of organochlorine insecticide residues in tobacco and tobacco products. Part II. Residue levels of leaf tobaccos processed in the DDR.]** *Nahrung* 22(9): 769-776; 1978. (7 references) (German)

Cigarette tobacco from the DDR, Bulgaria, Greece, Turkey, Yugoslavia, Hungary, N. Korea, Malawi, Sambia, Thailand, India, Brazil and the USA, and cigar tobacco from the DDR, Indonesia, Cuba, Argentina, Brazil, Paraguay and the Philippines (1973 and 1974 harvests) were analyzed for residues of 16 chlorinated hydrocarbons. With the exception of tobacco from N. Korea and Hungary, the total DDT-residue level was over 0.1 ppm. One cigar tobacco from Paraguay showed the highest residue at 7.20 ppm DDT reflecting that DDT was used in that country as an insecticide for tobacco until at least 1974. The residues can be attributed to the DDT persistence in the soil and the relatively high absorption by tobacco. All tobaccos contained lindane (0.03-0.33 ppm) and traces or very small quantities of the other organochlorine insecticides. The test results are presented in two tables (one for cigarette and one for cigar tobacco).

79-1060. Takamiya, T.; Uchida, A.; Ishiga, T. (Div. Rural Med., Inst. Environ. Epidemiol., Fac. Med., Chiba, Japan) **[On the intra-human body contamination due to pesticide residues.]** *Nippon Noson Igakkai Zasshi (J. Jpn. Assoc. Rural Med.)* 27(4): 765-771; 1978. (19 references) (Japanese)

Six kinds of organochlorine pesticide residues were detected in human organs, α-, β- and γ-BHC (lindane), *p,p'*-DDE, *p,p'*-DDT, and dieldrin. They were common, in the marked accumulation, in the adipose tissues, and showed a definite distribution in all organs examined. Two kinds of organochlorine pesticide residues, β-BHC and *p,p'*-DDE were detected in umbilical blood with concentrations of about 30% of that of the mother's blood. Relatively higher content of methyl mercury was found in hairs of farmers in some villages of Chiba Prefecture, however, the cause for this could

not be elucidated. No significant correlation was found between the concentrations of methyl mercury in their blood and their hair.

79-1061. Roberts, T. R.; Standen, M. E. (Shell Biosci. Lab., Sittingbourne Res. Cent., Shell Res. Ltd., Sittingbourne, Kent, England) **Degradation of the herbicide flamprop-methyl in soil under anaerobic conditions.** *Pestic. Biochem. Physiol.* 9(3): 322-333; 1978. (9 references)

The degradation of flamprop-methyl [Mataven, methyl (±)-*N*- benzoyl-*N*- (3-chloro- 4-fluorophenyl) -2-amino propionate] in soils stored under anaerobic conditions was determined. Samples of 100 g soil were mixed in glass jars with 0.25-0.4 ml ring-labeled ^{14}C flampropmethyl. Comparative studies included loam soils which were covered with water or stored in an atmosphere of nitrogen. The major product of anaerobic conditions was the carboxylic acid analog of flampropmethyl. This compound is also a major degradation product in soils under aerobic conditions. Additional compounds, identified as hydroxy derivatives of the carboxylic acid analog, were found in minor amounts when the soil was stored under anaerobic conditions for periods exceeding 1 mo. A new product, *N*-benzoyl- *N*-3-chloro- 4-hydroxyphenyl) 2-amino- propionic acid, was also isolated from waterlogged soil. Otherwise, little difference was noted between the results obtained by nitrogen only, and waterlogging methods of producing anaerobic conditions.

79-1062. Ennet, D. ; Hauschild, J.; Pank, F. (Inst. Arzneimittelwesen DDR, DDR-112 Berlin-Weissensee, DDR) **Rueckstaende von Pflanzenschutmitteln und Mitteln zur Steuerung biologischer Prozesse in Drogen des Arzneibuches der DDR, 2. Ausgabe. [Residues of pesticides and regulators of biological processes in drugs of the DDR Pharmacopeia, 2nd edition.]** *Pharmazie* 33(119: 697-705; 1978. (40 references) (German)

The use of plant protectants (fungicides, insecticides, herbicides, rodenticides) in the cultivation of medicinal plants in the GDR; the legal regulations in effect in the GDR on the application of plant protectants (PP) and regulators of biological processes (RBP) in cultivated plants; the hygienic-toxicological requirements for the admission of PP and RBP; and the maximum permissible PP and RBP residues in drugs listed in theGDR Pharmacopeia, 2nd. ed., are outlined.

79-1063. Zimak, J.; Piechocka, J.; Cwiertniewska, E.; Wachnik, Z. (Inst. Res. Food & Commod. Util., Natl. Inst. Hyg., Warsaw, Poland) **Badanie stopnia skazenia posilkow w zakladach zywienia zbiorowego pozostalosciami pestycydow. [Determination of the degree of food contamination with pesticide residues.]** *Rocz. Panstw. Zakl. Hig.* 29(5): 491-498; 1978. (20 references) (Polish)

The determination of chloroorganic and carbamate insecticides in diets for children (7-14 yr old) were performed. All analyzed food was provided by meal service of the Institute of Mother and Child in Warsaw. The analyses were performed 7 times per month during a one yr period. A homogenizer with 14000 cycles/min speed was used to prepare the samples for analysis. Extraction of chloroorganic insecticides was performed by using petroleum ether. The extract was then purified with petroleum ether, acetonitrile and in the chromatography column, with alumina. The carbamates were extracted with acetronitrile and methylene chloride. The extract was additionally purified with acetonitrile and petroleum ether. Gas chromatography was used to determine the organochlorine insecticides. Thin layer chromatography and colorimetry were used in the determination of the carbamates. In all samples, DDT was found in concentrations from 0.021 to 0.222 mg/diet (mean 0.080), lindane from 0.006 to 0.051 (mean 0.015), propoxur 0.04-0.26 (mean 0.14). Thiram was found in some samples in amounts of 0.05-0.14 mg/diet. The mean insecticide content corresponded to the following percent of permissible daily intake for adults: DDT, 27%; lindane, 3%; and propoxur, 11%. The greatest amounts of organochlorine insecticides were found November to February, and carbamates, from August to October.

79-1064. Moreale, A.; Van Bladel, R. (Dep. Soil Sci., Univ. Louvain, Louvain-La-Neuve, Belgium) **Soil interactions of herbicide-derived aniline residues: A thermodynamic approach.** *Soil Sci.* 127: 1-9; 1979. (28 references)

Thermodynamic analysis of adsorption of aniline and *p*-chloroaniline on soil organic matter are presented. Interaction between anailine residues and soil increase with higher temperatures. Soignies soil colloids showed higher affinity for chloroaniline than for aniline with increasing temperatures. An inverse relationship was found to exist between magnitude of adsorption of the aniline residues and their water solubility. The temperature coefficient of the thermodynamic equilibrium constant/unit of organic matter points to a greater reactivity of Soigies soil organic matter. Results of the thermodynamic study indicated that diffusion processes of *p*--chloroaniline play a leading role in the overall energetic process of the adsorption reaction.

79-1065. Pfeilsticker, K.; Leyendecker, A. (Lehrstuhl Lebensmittelwissensch., Rheinische Friedrich Wilhelm Univ., D-5300 Bonn, BRD) **Restmengen von Ethylenchlorhydrin (ECH) in Kakaotrunk und Schokolade. [Residues of ethylene chlorohydrin (ECH) in infusions of cocoa and chocolate.]** *Z. Lebensm. Unters. Forsch.* 167(5): 329-332; 1978. (19 references) (German)

Residues of 1.8-5.6 ppm ethylene chlorohydrin (ECH) were found in chocolate (diet and bitter chocolate, min. 60% cocoa). Residues of 0.2-0.6 ppm ECH were found in four commercial chocolate drinks and six cocoa distillates

prepared by the authors from commercially available cocoa powder (6 g cocoa/80 ml water; by boiling) by sensitive analysis method. A study in time showed that during the boiling of the drinks the ECH concentration was reduced in 15 min to 0.14 by evaporation alone. No reaction to ethylene oxide or ethylene glycol or other metabolites was established.

See also **79-1026, 79-1071, 79-1104, 79-1117, 79-1173** *and* **79-1223.**

79-1066. Georgouras, K.; Kocsard, E. (Skin Dep., R. Prince Alfred Hosp., Sydney, Australia) **Micropapular sarcoidal facial eruption in a child: Gianotti-type perioral dermatitis.** *Acta Derm. Venereol.* 58(5): 433-436; 1978. (11 references)

A 13 year old boy presented with a facial rash which had existed for a period of 3 wk, on chin, forehead, nose, paranasal, and perioral areas. Several factors were considered as possible causitive agents for his condition including an insect spray and dog flea collar. The final decision was that the boy had reacted to the essential oils contained in bubble gum, as he was an avid bubble gum fan, often blowing bubbles which burst over his face. After the condition was healed, a process which required 12 mo, it was considered unethical to risk re-exposure to the suspected agent.

79-1067. Peterson, J. (Author address not given) **Seveso: the event.** *Ambio* 2(5-6): 232-233; 1978. (5 references)

The events surrounding the explosion at the ICMESA plant which led to the contamination of the nearby suburb of Seveso with TCDD are recounted. On Saturday July 10, 1976 at about 12:30 pm, the safety value of the chemical reactor broke at the Hoffman-LaRoche-owned factory releasing the thick white cloud which drifted with the breeze before it came to settle over a 5 km by 700 m area of the town. The immediate effects of the contamination were the development of chloracne in many children and the death of thousands of exposed animals. Local authorities two weeks later divided the area into three zones: zone A was to be completely evacuated and sealed off because of heavy contamination, zone B was sealed off to non-residents, and school-aged children were evacuated to out of town day-care centers during the day, and in zone R, the population was to be closely monitored for possible risks to health. Epidemiological committees were set up, and large scale decontamination projects included the incineration of TCDD contaminated items from zone A. Among the pregnant women of the town, a number of legal abortions were granted. Most of the evacuated residents have since been returned to their homes, but the long term effects of the TCDD contamination remain to be seen.

79-1068. Bonaccorsi, A.; Fanelli, R.; Tognoni, G. (Inst. Mario Negri, I-20157 Milan, Italy) **In the wake of Seveso.** *Ambio* 7(5-6): 234-239; 1978. (28 references)

The incident which occurred at Seveso and the consequences, both political and epidemiological, are discussed. For many years ICMESA, the factory responsible for the explosion, was on record with the local authorities for limiting safety measures in its plant to increase production and profit. In the years prior to the explosion, considerable amounts of TCDD may have been released into the atmosphere by this company. After the explosion which produced a great white cloud containing TCDD which settled over the town of Seveso, many weeks passed before the public was alerted to the true dangers of this chemical, and they continued to eat their home grown produce and allow their children to play in the streets. Difficulties arose in initiating surveillance of the damages due to conflicts between political groups and medical institutions as to who should set up the investigations. Once plans were underway to monitor the contaminated areas, children were aldready suffering from chloracne and many animals, domesticated and wild, had died. The results of surveys of TCDD levels in the tissue of several animal species is reported, as well as the results of epidemiological studies of human populations. The studies of the effects of TCDD on pregnant women and their babies show a higher incidence of spontanous abortion in TCDD-exposed mothers. Other clinical findings suggest deleterious effects on the peripheral nervous system, as well as liver damage. Many ecological questions connected with the Seveso incident remain to be answered.

79-1069. McLeod, D. K. (Author address not given.) **Precautions for the use of ethylene oxide.** *AORN Journal* 29(2): 340-343; 1979. (6 references)

Ethylene oxide (EO) is used as a sterilizing agent for various commodities, equipment, and supplies. Due to its toxicity and flammability, EO requires special handling. All persons involved with the use of EO must be properly trained and informed to reduce hazards. EO has a tendency to stratify and concentrate, and therefore rooms where EO is used or stored should be well ventilated to prevent EO residues from building up to concentrations toxic to the operators. Toxicity manifests itself in respiratory and eye irritations, skin sensitization, vomiting, and diarrhea. Chronic effects include respiratory irritation, secondary respiratory infection, anemia, and altered behavior. Biological monitoring is highly recommended for each EO sterilization cycle.

79-1070. Pinto, S. S.; Henderson, V.; Enterline, P. E. (ASARCO, Inc., Takoma, WA) **Mortality experience of arsenic-exposed workers.** *Arch. Environ. Health* 33(6): 325-331; 1978. (15 references)

The mortality experience of all pensioners from a copper smelter who were aged 65 or over between 1949 and 1973 has been studied. An index of arsenic exposure was developed for all operations in the plant for 1973. This was applied to all individuals studied so that a comparative measure could be made of each individual's working-life exposure to arsenic. The overall mortality of this cohort was 12.2% higher than for males living in the same area, of the same ages, and in the same time periods. The excess mortality was due chiefly to respiratory cancer where mortality was three times the expected. Because other contaminants were present in the atmosphere, it is not certain that arsenic was entirely responsible for the respiratory cancer observed, yet a close association with arsenic seems highly likely. (Author abstract by permission)

79-1071. Highland, H. A.; Schoenherr, W. H.; Winburn, T. F.; Lawson, D. E. (Stored-Prod. Insects. Res. & Dev. Lab.,

Fed. Res., Sci. & Educ. Adm., USDA, Savannah, GA) **Phosphine and methyl bromide fumigation of commodities in woven plastic or paper bags.** *Cereal Foods World* 24(1): 19-21, 26; 1979. (8 references)

The concentrations of phosphine and methyl bromide on commodities packaged in woven polypropylene (PP) and polyethylene (PE) lined paper bags during fumigation and aeration were measured. Mortality of insects in the bags during treatment was also determined. Residues present in the commodities after treatment were also determined. Phosphine penetrated the PE-lined paper bags within 4 hr, but the concentrations were lower in the interior bags in the stack than in the exterior bags. Lethal concentrations were maintained (57 to 1,105 ppm) in all the bags throughout the fumigation period which lasted three days. Even after 48 hr of aeration the bags contained concentrations which were easily detected. Phosphine did not penetrate the woven PP bags as well. All insects in the phosphine-fumigated bags were dead when examined 6 hr after removal from the bags. Some insects survived in the PE-lined paper bags fumgiated with methyl bromide, especially in the middle and high bags in the stack. Inorganic bromide residues ranged from 13.3 ppm in rice from high PP bags to 42.1 ppm in soy-fortified bulgur from low PP bags. None of the commodities contained more than 0.007 ppm phosphine.

79-1072. Matsushima, S. (Dep. Health Adm., Saku Gen. Hosp. Usuda, Nagano, Japan) **[Intoxication by pesticides for agricultural uses. (First aid practices).]** *Chiryo (J. Therapy)* 61(2): 375-380; 1979. (6 references) (Japanese)

Clinical treatments necessary in first aid for pesticide intoxication are described. The check points at the first medical examination should include a medical history of any present illnesses, especially those involving pesticides, preservation of any discharged materials from the patient, and observation of the state of intoxication. First aid measures include removal of the pesticide to prevent absorption into the body, fluid supplementation, artifical respiration, oxygen therapy, dialysis, perfusion of blood, forced diuresis, administration of sedatives antispasmodic agents, cardiotonics stimulants for respiration and antidotals (glutathion). Finally, specific treatment for the type of pesticide involved (organophosphorus, methylcarbamate, organochlorine, organofluorine, nicotine, organosulfur, antibiotic, or herbicide) should be started.

79-1073. Schubert, H. (Dep. Dermatol., Med. Sch. Erfurt, DDR-50 Erfurt, DDR) **Contact dermatitis to sodium *N*-methyl dithiocarbamate.** *Contact Dermatitis* 4(6): 370-382; 1978. (3 references)

A mixture of sodium *N*-methyl dithiocarbamate, water, and sodium hydroxide is used for chemical treatment of potatoes. The mixture serves as an agent against nematodes and a soil fumigant. Tests were conducted to determine whether the metham-sodium itself, or one of the decomposition products, causes allergic type contact dermatitis in humans exposed to the substance. Tests indicate that the main allergen is methyl mustard oil, since its isothiocyanate group binds very easily to protein. It is noted that metham-sodium may also cause a toxic dermatitis as do other mustard oil forming agents.

79-1074. Perelygin, V. M.; Bykovskaia, T. K. (Inst. Public Health, A.N. Sysina, Moscow, USSR) **Gigienicheskie podkhody k standartizatsii organicheniia postuplyeniia vrednykh veshchestv v pochvu. [Sanitary approaches to the standardization measures to prevent soil contamination.]** *Gig. Sanit.* (11): 22-25; 1978. (3 references) (Russian)

Sixty-one soil contaminants, including pesticides were classified by their properties of toxicity, stability in soil, and ability of migration in soil, air, water, and plants. The grouping of the compounds in this manner was an attempt at standardization of the terminology so that pretection of the soil from contamination could be facilitated.

79-1075. Zolotnikova, G. P. (Inst. Vocat. Prot. Agric., Orel, USSR) **K Voprosu o Rannei Diagnostiki i Profilaktike Profpatologii Pestitsidnoi Prirody u Teplichnits. [On early diagnosis and prophylaxis of pesticide-induced occupational pathologies in female workers of greenhouses.]** *Gig. Trud, Prof. Zabol.* (12): 15-18; 1978. (10 references) (Russian)

An attempt was made to evaluate the effect of some pesticides on the immune reactivity of the greenhouse workers, and to test the sensitivity of various assays for the early detection of pesticide-induced pathologies. The indices of specific and nonspecific immunity was studied in 20 female workers of the greenhouses (aged from 20 to 40 yr) who had the occupational exposure to pesticides of more than 5-yr duration. It was found that all female greenhouse workers had decreased PHA-induced blast transformation of the lymphocytes (36.0%, compared with 68.6% in controls), significant decrease in the titer of normal hemagglutinating antibodies and marked decrease in the total hemolytic activity of the blood serum. Some workers showed symptoms of autosensibilization; 15 workers had increased number of autohemolysin producing cells (5.5%, compared with 0.3% in controls) and 5 workers had antiliver autobodies at titers of 1:20 - 1:40. The majority of workers had positive reaction of specific agglomeration of the leukocytes (as the allergens used were pesticides phosphamide, trichlorfon, polyram and dicofol). Preliminary results of *in vitro* stimulation of reaction of PHA-induced blast-transformation with vitamins C, B1, B2, B12, methiomine and choline hydrochlorine indicate that these pharmaceuticals can be used for the prophylaxis of pesticide-induced immunological disorders.

79-1076. Zielhuis, R. L.; van der Kreek, F. W. (Coronel Lab. Occup. & Environ. Health, Fac. Med. Univ. Amsterdam, Amsterdam, The Netherlands) **Calculation of a safety factor in setting health based permissible levels for occupational exposure. II. Comparison of extrapolated and published permissible levels.** *Int. Arch. Occup. Environ. Health* 42(3/4): 203-215; 1979. (17 references)

The procedure which has been proposed for extrapolating animal data to permissible levels for human exposure during the course of one's occupation has been examined for 11 compounds: acrylamide, cadmium, carbon monoxide, chlorpyrifos, 1,2-dichloroethane, *n*-hexane, malathion, propoxur, toluene, trichloroethylene, and trichlorobenzene. The major conclusion from this study was that when a permissible level for occupational exposure was determined solely by extrapolation from animal data, all levels were either reasonable similar to or lower than the permissible levels as published in the United States and the Federal Republic of Germany. Of published USSR levels, only 4 of 9 are lower than the extrapolated permissible levels. It is suggested that the proposed extrapolation procedure may be regarded as a useful tool in evaluating health risks for new agents, particularly if more adequate animal toxicity data becomes available.

79-1077. Anonymous **Beginning of the end for use of endrin?** *J. Am. Med. Assoc.* 241(4): 353; 1979.

Due to the findings that endrin has caused birth defects in laboratory animals, the EPA would like to place certain restrictions on the use of the pesticide in the US. Although the agency has reported that the pesticide does not conclusively cause hazards from skin contact or tumorigenesis in animals or humans, EPA would like to impose standards for workers (especially women) who come in contact with endrin. Protective clothing is recommended to reduce personal injury from endrin, and measures to safeguard the environment from contamination are being sought. Under the new EPA proposal, the use of endrin would be banned on cotton crops, in areas where possible contamination of the water may take place, especially those states east of the Mississippi River, as well as Louisiana, Arkansas, and parts of Oklahoma and Texas. Restricted use of endrin on wheat, apples, and a few other crops would be allowed, however it would not be permitted for use on ornamentals or in bird control products.

79-1078. Kopelman, R.; Miller, S.; Kelly, R.; Sunshine, I. (Cent. Nephrol. Med. Group, Inc., Bakersfield, CA 93301) **Camphor intoxication treated by resin hemoperfusion.** *J. Am. Med. Assoc.* 241(7): 727-728; 1979. (15 references)

A case is reported of a 37-yr-old man who mistakenly swallowed 20% camphor oil which he thought was caster oil. The man vomited two times before arriving at the hospital where gastric lavage was performed immediately. His vomitus, breath and urine smelled of camphor. He had ingested approximately 18 g of camphor which is presumably a lethal dose. The patient was treated for grand mal seizures, and intubation was started along with the administration of 100 mg of diazepam, 50 mg of chlorpromazine, 300 mg of secobarbital, and 300 mg of phenobarbital. During the night he underwent bronchoscopy for a collapsed right upper lobe. The patient remained comatose, and an attempt was made to remove the absorbed camphor from the body by amberlite hemoperfusion resin. Many complications occured with the hemoperfusion equipment but after 2.5 hr of therapy, the patient began to respond. After gaining consciousness, the rest of his hospital stay was uneventful and he was discharged after 2 days. The levels of camphor found in the plasma samples after analysis by gas chromatography showed that, before the start of treatment, the camphor levels were about 1.7 μg/ml. It was calculated, from camphor levels taken after treatment, that about 60% extraction of camphor was achieved by the hemodialysis therapy. Thus this method of treatmnt is recommended for removal of camphor from the body after large doses of this compound have been ingested.

79-1079. Rappe, C. (Dep. Org. Chem., Umea Univ., S-901 87 Umea, Sweden) **Dioxiner och dibensofuraner - tva substansgrupper i blickpunkten. [Polychlorinated dibenzodioxins (PCDDs) and dibenzofuran (PCDFs) - compounds of current interest.]** *Lakartidningen* 76(1-2): 21-24; 1979. (45 references) (Swedish)

Studies on the occurrence and effects of dioxins and dibenzofurans are reviewed. Dioxins and dibenzofurans occur mainly as impurities in phenoxy acids, such as in 2,4,5-T and in chlorophenols. 2,3,7,8-TCDD is present in 2,4,5-T, and 1,2,3,6,7,8-hexachloro dibenzodioxin in pentachlorophenol (PCP). Tetrachlorodioxin and other dioxins as well as dibenzofurans were found to be carcinogenic in experimental animals, but these findings do not rule out the carcinogenicity of the phenoxy acids and chlorophenols in which they occur as impurities. Increased incidence of abortion and primary liver cancer was found in the Vietnamese population exposed to Herbicide Orange. An epidemiological case-control study demonstrated an increased incidence of malignant mesenchymal soft-tissue tumors in subjects exposed to phenoxy acids and chlorophenols occupationally.

79-1080. Il'ina, V. I. (All-Union Sci. Res. Inst. Hyg. & Toxicol. Pestic. Polymers & Plastics, Kiev, USSR) **Deyaki dani pro stan menstrual'noi funktsii u zhinok, yaki pratsyuyut' z pestitsidami. [Menstrual function in women working with pesticides.]** *Pediatr. Akush. Ginekol.* (5): 55-56; 1978. (Ukrainian)

The menstrual function was studied in 306 women occupationally exposed to pesticides and in 115 non-exposed controls. The exposed women were in the age bracket 18-40 yr, and the length of service was 5-15 yr. Seventy-nine women were exposed to BHC, 97 to TMTD (thiram) and 130 to organophosphorus and organochlorine pesticides. One hundred and five women suffered acute poisoning by PCP. The incidence of menstrual disorders was 3/306 before occupational exposure, and 33/79 in the group exposed to BHC, 25/97 in the group exposed to TMTD, 13/130 in the group exposed to organophosphorus and organochlorine pesticides, and 36/105 in the controls ($p < 0.001$). Shortening of the luteinizing phase was observed in most patients with menstrual disorder, the basal temperature was monophasic in some cases. Vaginal secretion from the women exposed to BHC contained 0.01-0.1 mg/g of BHC, and that from PCP-exposed women contained PCP in 13% of all cases. The menstrual disorders were frequently associated with ex-

tragenital diseases (acute hepatitis, cholecystitis and diencephalitis).

79-1081. Jaros, F.; Zuffa, L.; Kratinova, R.; Skakala, I.; Domsova, J. (ul. Slov. armady 40, CS-911 71, Trencin, Czechoslovakia) **Akutna perkutanna intoxikacia Gramoxonom. [Acute percutaneous Gramoxone poisoning.]** *Prac. Lek.* 30(7): 260-263; 1978. (20 references) (Slovak)

The case of a 44-yr-old man who suffered acute fatal percutaneous poisoning with Gramoxone (20% paraquat) is described. He was spraying plants with Gramoxone without complying with the safety rules. Heavy itching of the skin of the neck and scrotum and severe systemic poisoning which was seen in the damage of the liver, kidneys and lungs developed. The patient died with symptoms of renal and respiratory insufficiency. Necrotizing alveolitis was found in the lungs; megakaryocytes were seen in some pulmonary capillaries. The liver showed steatosis. Parenchymatous dystrophy with vacuolization of the tubular epithelium was found in the kidneys.

79-1082. Budy, A. M.; Rashad, M. N. (Dep. Genet. & Cancer Cent. Hawaii, Pac. Biomed. Res. Cent., Univ. Hawaii, Honolulu, HI 96822) **Cancer mortality among carpenters in Hawaii.** In: *Prevention and Detection of Cancer. Part. 1. Prevention.* Nieburgs, H. E., ed. (Marcel Dekker, Inc.: NY): 1:901-913; 1977. (7 references)

To determine the effects of the use of arsenate wood preservatives on the incidence of cancer among carpenters, microfilms of death certificates for the period of January 1948 to December 1951 (low use of arsenate preservatives) and from January 1970 to December 1973 (high use of arsenate preservatives) were compared. Data were analyzed statistically on the basis of date of death, sex, race, marital status, birth, and causes of death. Results showed that in comparing mortality of carpenters with that of matched controls, cancer among carpenters was higher than the controls only in the early groups. The excess of cancer was statistically significant; however, the type of cancer showed no specific trend for localization in one type of tissue. In comparison with the general population, the incidence of cancer was higher in carpenters in both study periods. These findings were shown to be consistent with earlier studies reporting an excess of cancer deaths among carpenters; however, the relative risk for cancer among carpenters exposed to arsenate-treated wood did not show an excess of significance for either of the periods studied.

79-1083. Rehder, H.; Sanchioni, L.; Cefis, F.; Gropp, A. (Abt. Pathol., Med. Hochschule, D-2400 Luebeck, BRD) **Pathologisch-embryologische Untersuchungen an Abortusfaellen im Zusammenhang mit dem Seveso-Unglueck. [Pathological and embryological studies of abortions in connection with the Seveso-accident.]** *Schweiz. Med. Wochenschr.* 108(42): 1617-1625; 1978. (39 references) (German)

After the explosion at a chemical plant in Seveso, Italy, on July 6, 1976, during which vast populated areas were contaminated with TCP and TCDD, embryological and histomorphological studies were conducted on material from 30 interrupted pregnancies (average age of fetus 10-12 wk) and from 4 spontaneous abortions (11th-24th wk of pregnancy). The material came from 3 zones with different contamination levels (over 5 μg TCDD/m^2, up to 50 μg TCDD/m^2; and up to 5400 μg TCDD/m^2). The studies did not reveal any mutagenic, teratogenic or fetotoxic effect directly attributable to TCDD. The material from the spontaneous abortions showed different morphological changes in fetus and placenta, apparently based on a variety of causative factors. However, due to the incompleteness of the material and the limitation of the examination techniques (material was fixed in formalin, Bouin or Carnoy solution, and therefore, only paraffin histology was possible) it was not possible to completely preclude the possibility of embryotoxic effects of TCDD.

79-1084. Nakamura, M.; Kumanomido, Y.; Kobuchi, K.; Kajitani, T.; Nagano, H.; Mizushima, M.; Kamioka, K.; Ito, J. (Dep. Pediatr., Kawasaki Hosp., Kawasaki Med. Coll., Okayama, Japan) **[An autopsy record on a child intoxicated by paraquat-dichloride.]** *Shonika Shinryo (J. Pediatr. Pract.)* 42(3): 293-297; 1979. (20 references) (Japanese)

The clinical course and autopsy findings of a case of accidental paraquat dichloride poisoning are described. After a 2.6-yr-old girl ingested the pesticide, 16 days passed before the cause of her incipient symptoms was diagnosed. Dyspnea set in and the child died. Upon autopsy the major findings were an interstitial pneumonia accompanied by lung fibrosis. Small excavations were seen on the surface of the liver along with peripheral vacuolation of hepatic lobules. Cardiac hypertrophy, possibly due to hypoxia from pulmonary fibrosis, and vacuolation of cardiac muscles was noted. Thrombogenesis of the cardiac auricle, possibly caused by the vascular endothelial lesions due directly to the paraquat dichloride ingestion, and mucosal hemorrhage of the lungs, pericardium, and digestive tracts were also found. Stricter regulations for the sale and use of this poisonous herbicide are recommended.

79-1085. Gembitskii, E. V.; Gaiduk, V. A.; Zakurdaev, V. V. (Mil. Med. Sch. S.M. Kirov, Leningrad, USSR) **Patogenez, ranniaia diagnostika i lechenie ostroi dykhatel'noi nedostatochnosti pri otravlenii fosfororganicheskimi insektitsidami. [Pathogenesis, early diagnosis and treatment of acute respiratory insufficiency following poisoning with organophosphorus insecticides.]** *Sov. Med.* (9): 93-99; 1978. (26 references) (Russian)

Oral poisoning of 130 people with organophosphorus compounds was investigated to determine an early diagnosis and treatment of acute respiratory insufficiency. The external respiration apparatus and the function of the respiratory muscles were studied through various instrumental methods. The patients were divided into four groups, depending on the level of poisoning: low, medium, severe, and extremely

severe. Most of the patients were taken to the hospital 1-3 hr after poisoning. Twenty healthy people made up the control group. The respiratory reserve and the oxygenation of the arterial blood were below normal, and hyperventilation and moderate damage to the bronchial patency were found in the ow level poisonings. In the medium level poisoning, the bronchial patency suffered a greater damage, which led to hypoxemia that was treated with antidotes. Paresis or paralysis of the respiratory muscles developed in the severe poisoning, while the breathing was arrested and followed by a paralysis of the respiratory muscles within the first 24 hr in the extremely severe poisoning. This required the use of a respiratory and antidote therapy. Antibiotics and their dosage for the treatment of respiratory ailments were given.

79-1086. Strik, J. J. T. W. A.; Doss, M. (Abt. Toxikol., Landwirtsch. Univ., Wageningen, The Netherlands) **Chronisch hepatische Porphyrie durch polyhalogenisierte aromatische Verbindungen bei Menschen. [Chronic hepatic porphyria by polyhalogenated aromatic compounds in humans.]** *Therapiewoche* 28(44): 8460, 8463-8466, 8469; 1978. (33 references) (German)

Health risks (different types of porphyrias) to humans and animals from porphyrinogenic polyhalogenated aromatic hydrocarbons, such as hexachlorobenzene, polychlorinated biphenyls, polybrominated biphenyls, chlorinated phenols and benzenes, and chlorodibenzodioxin found in food are reviewed, as well as industrial work-related hepatic diseases caused by chlordibenzodioxin, vinyl and methyl chloride and hexachlorobenzene.

79-1087. Duffy, F. H.; Burchfiel, J. L.; Bartels, P. H.; Gaon, M.; Sim, V. M. (Seizure Unit, Neurophysiol. Lab., Dep. Neurol., Children's Hosp. Med. Cent., Boston, MA 02115) **Long-term effects of an organophosphate upon the human electroencephalogram.** *Toxicol. Appl. Pharmacol.* 47(1): 161-176; 1979. (48 references)

The brain electrical activity of workers exposed to the organophosphate compound (OP), sarin, was compared to that of control subjects. Exposed workers had a history of one or more documented accidental exposures to toxic levels of sarin. However, no exposed subject had exposure within 1 year of his examination. The comparison included standard clinical electroencephalograms (EEGs), computer-derived EEG spectral analysis, and standard overnight sleep EEGs. It was not possible to diagnose subjects individually by expert visual inspection of their EEGs. However, statistically significant between-group differences for both the visually inspected and computer-derived data were reported by both univariate and multivariate statistical methods. Different EEG changes revealed by visual inspection and computer-derived spectral analysis appear to reflect the differing sensitivities of these two analytic techniques. Statistically significant group differences included increased beta activity, increased delta and theta slowing, decreased alpha activity, and increased amounts of rapid eye movement sleep in the exposed population. It is suggested the the above findings represent an unexpected persistence of known short-term OP actions. It is also suggested that these results, when taken along with the reported long-term behavioral effects of OP exposure, provide parallel evidence that OP exposure can produce long-term changes in brain function. (Author abstract by permission)

79-1088. Braude, G.; Sagik, B. P.; Sorber, C. A. (Cent. Appl. Res. & Technol., Univ. Texas, San Antonio, TX) **Human health risk? Using sludge for crops.** *Water Sewage Works* 125(12): 62-64; 1978. (5 references)

Possible hazards to human health by the use of sludge and wastewater on agricultural lands are reviewed. One area of possible contamination arises from the presence of organic chemicals in drinking water. These chemicals have been divided into four classes: organochlorine insecticides, chlorinated phenolics, polyaromatic ring compounds, and others such as phthalates and sulfonates. As many of these compounds are only slightly soluble in water, they are found in both the wastewater and sludge material. Of special importance are the organochlorines due to their high resistance to degradation in the environment and their solubility in fat. They are quite capable of bioaccumulating and translocating to animals and man through the food chain. Some are carcinogens, others are suspected teratogens. Daily acceptable intake values have been calculated for many of the chemicals.

79-1089. Pickersgill, J.; Robin, E. D.; Theodore, J.; Raffin, T. A.; Laman, P. D.; Simon, L. M. (Stanford Univ. Sch. Med., Stanford, CA) **Paraquat ingestion and pulmonary injury.** *West. J. Med.* 128(5): 26-34; 1978. (18 references)

A 47-yr-old man with advanced metastatic adenocarcinoma of the prostate gland "accidentally" ingested paraquat at his home. Forty-eight hr after the incident he underwent forced diuresis and iv administration of furosemide to reduce plasma and tissue paraquat levels. However, the patient exhibited acute renal failure, at which time peritoneal dialysis was instituted. During the following day arterial blood gas values deteriorated and the patient became tachypneic. Despite chances of worsening lung damage with increased forced respiratory oxygen, supplemental O_2 was added to maintain oxygen pressure. The next day the patient became severely dyspneic, followed by cardiac arrest and death. Ingestion of paraquat can lead to rapidly fatal pulmonary edema and hemorrhage, along with renal and hepatic failure. Removal of paraquat from the gastrointestinal tract before absorption is accomplished by gastrointestinal lavage and instillation of adsorbents (bentonite or fuller's earth). Forced diuresis ultrafiltration and hemodialysis prevented continued absorption. The efficacies of D-propanolol and immunosuppressive agents in modifying cellular toxicity have not been impressive. Paraquat produces lung damage by production of oxygen free radical damage. Oxygen free radical superoxide anions combine with H_2O_2 formed from superoxide in a reaction when catalyzed by the enzyme superoxide dismutase, to produce the most damaging oxygen free radical, the hydroxyl free radical.

79-1090. Fairshter, R. D. (Dep. Med., Univ. California, Irvine, Orange, CA) **Paraquat poisoning: an update.** *West. J. Med.* 128(5): 56-58; 1978. (18 references)

Since its commercial release, paraquat has been linked with over 200 deaths from accidental or suicidal ingestion. Most poisonings occur with the concentrated solution of the product, as aerosol an granular formultions contain relatively low active paraquat concentrations. Therapeutic approaches to victims of paraquat ingestion include attempts to minimize absorption, accelerate excretion, and modify the tissue effects of the already absorbed compound. The first of these objectives is achieved by gastric lavage or "gut lavage" (gastrointestinal lavage) followed by repeated doses of fuller's earth, a specific paraquat adsorbent. Accelerated excretion can be accomplished by forced diuresis, hemodialysis, or charcoal hemoperfusion. Measures to modify tissue toxicity are directed toward minimizing pulmonary damage. Administration of superoxide dismutase (SOD) or subatmospheric oxygen concentrations have been occasionally successful. The therapeutic role of D-propanolol and corticosteroids continues to be controversial and require further evaluation.

79-1091. Trojanowska, M.; Dabski, H.; Koziarska, H. (Acad. Med., PL-20-090 Lublin, Poland) **Zatrucia pestycydami fosfororganicznymi. [Poisonings with organophosphorus pesticides.]** *Wiad. Lek.* 31(19): 1353-1358; 1978. (7 references) (Polish)

Fifty men and women (ranging from 14 to 30 yr of age, mainly 21 to 30 yr old) were treated for organophosphorus pesticides poisoning. In 74.0% of the patients, the poisonings were occupationally related or accidental, and in 26% they were suicidal. The treatment lasted from 1 to 10 days in 59% of the patients, 11-20 days in 21.3% of the patients and 21-35 days in 10.7% of the patients. A pharmacological treatment was applied in all patients and consisted of administration of atropine, PAM (pralidoxime), and toxogonine. Drug infusions were given to 85.7% of the patients in polyelectrolyte solution, 5% solution of glucose, and physiological saline. Additional drugs used were micoren, cocarboxylase, calcium gluconate, and vitamins. Some antibiotics, used in 78.6% of the patients were oxyterracin and penicillin. The diuretic drug, furosemide was applied in 32.1% of the patients.

79-1092. Damstra, T. (Off. Health Hazard Assess., Natl. Inst. Environ. Health Sci., Research Triangle Park, NC) **Environmental chemicals and nervous system dysfunction.** *Yale J. Biol. Med.* 51(4): 457-468; 1978. (105 references)

Several examples serving to link nervous system dysfunction with associated exposure to particular chemicals are discussed, including acute and chronic exposure to chlorinated hydrocarbon pesticides. Particular attention is drawn to the massive exposure of humans to kepone (chlordecone). The exposed workers in this case suffered severe neurological and behavioral impairment along with liver disorders and decreased sperm production. Tremors, slurred speech and stuttering, opsoclonus, exaggerated startle response and signs of cerebellar dysfunction were evident. Anxiety, irritability, memory disturbances and hyperkinesis were noted. In many cases organophosphorus esters have replaced the more persistent chlorinated hydrocarbons as insecticides. While these are rapidly hydrolyzed and have few cumulative ecological effects, they do produce acute toxic effects and frequently cause accidental fatalities in both humans and domestic animals, due to their cholinesterase inhibition resulting in excessive muscarinic and nicotinic effects. A small group of organophosphorus compounds also produced degenerative changes in the central and peripheral nervous system ultimately resulting in a sensory-motor neuropathy.

79-1093. Takekawa, T.; Oda, S.; Kaku, K.; Shiomura, K.; Sasai, K.; Unoki, T.; Matsumoto, N.; Miwa, S. (Sch. Intern. Med. III, Fac. Med., Yamaguchi Univ., Yamaguchi, Japan) **[An autopsy record of a man intoxicated by paraquat-dichloride.]** *Yamaguchi Igaku (Yamaguchi Med. J.)* 27(4): 351; 1978. (Japanese)

The clinical course and results of an autopsy on a 38-yr-old man intoxicated accidentally by paraquat dichloride are reported. Four days before hospitalization his major symptoms were pyrexia and polypnoea. Findings upon hospitalization included moderate cyanosis of the extremities, moist rales of the total left pulmonary field, crepitant rales in the left lower back field, and increased BUN, creatinine, transaminases, LDH, and paraquat in the urine. Although the patient was kept in an oxygen tent and given peritoneal perfusion and strong diuretics, he died on the 5th day of hospitalization. Findings on autopsy were fibrosis, bronchial pneumonia and stagnation in the lungs, and conspicuous turbid swelling of renal tubules. No remarkable changes were noted in other organs.

79-1094. Riedel, H. (Pathol. Inst., Friedrichstrasse 41, DDR-801 Dresden, DDR) **Die Bedeutung der Leberbiopsie fuer die Diagnose gewerblicher Leberschaeden (Histopathologische Untersuchung). [Significance of liver biopsy for diagnosis of occupational liver damage (histopathological investigation).]** *Z. Gesamte Inn. Med. Ihre Grenzgeb.* 33(24): 881-887; 1978. (23 references) (German)

The morphological analysis of 61 liver biopsies of 29 human patients subjected to the acute and long-term effects (2.5 mo-20 yr) of industrial toxic substances (plant protectants, pesticides and solvents) established hepatoses with unspecific reactive hepatitis of different intensity. Transition to chronic liver diseases was not observed. The importance of the earliest possible first biopsy after clinical detection of such hepatic lesions is pointed out.

See also **79-1003, 79-1013, 79-1014, 79-1016, 79-1017, 79-1021, 79-1104, 79-1124** *and* **79-1145.**

79-1095. Uesugi, Y.; Kodama, O.; Akatsuka, T. (Natl. Inst. Agric. Sci., Nishigahara, Kita-ku, Tokyo, Japan) **Inhibition of fungal metabolism of some organophorphorus compounds by piperonyl butoxide.** *Agric. Biol. Chem.* 42(11): 2181-2183; 1978. (7 references)

Mycelial cells were incubated in 15 ml of *M*/30 phosphate buffer (pH 7.0) containing either BPA or IBP and 2% glucose. The initial concentration ob bothe BPA and IBP was 0.2 m*M*, within the range of their water solubility. The fungal metabolism of BPA was inhibited through hydroxylation and *N*-demethylation by piperonyl butoxide in both the Hoku-373 and Fm 3-1 strains used. This may indicate fungal metabolism occurred by mixed function oxidases. IBP metabolism was inhibited through cleavage of the S-C bond by piperonyl butoxide in both strains as well. Cleavage of the thiol ester linkage suggests that IBP is also metabolized by mixed function oxidases and that the inhibition of fungal metabolism of BPA by IBP is a competitive inhibition of mixed function oxidase activity. Piperonyl butoxide is suggested to be a possible synergist for IBP or BPA.

79-1096. Bouldin, T. W.; Cavanagh, J. B. (Dep. Pathol., Sch. Med., Univ. North Carolina, Chapel Hill, NC 27514) **Organophosphorus neuropathy. I. A. teased-fiber study of the spatio-temporal spread of axonal degeneration.** *Am. J. Pathol.* 94(2): 241-252; 1979. (13 references)

Young adult, male and female, random-bred cats were given a single ip injection of DFP at 40 mg/kg. This was followed by an eserine/atropine injection. The cata exhibited clinical signs of acetylcholine poisoning; pupillary dilatation and generalized muscular fasciculations. Subsequent injections of DFP did not exacerbate these signs. By 24 hr post DFP injection, the cats apparently returned to a normal state except for a minimal hind-limb weakness which resolved itself over the next 24 hr. Hind-limb ataxia, appeared 16 to 18 days after DFP days. Hind-limb hypotonia, hind-limb weakness, and minimally increased deep-tendon reflexes also developed. Histological studies revealed that the topographic distribution of axonal degeneration was characteristic of a dying-back neuropathy. Axonal degeneration was initially focal and nonterminal but the axonal degeneration subsequently spread in a somatofugal direction to involve the entire distal axon. The axonal degeneratin was preceeded by nerve fiber varicosities and paranodal demyelination. Neurotoxic organophosphates are assumed to induce focal, distal, but not terminal, axonal degeneration.

79-1097. Bouldin, T. W.; Cavanagh, J. B. (Dept. Pathol., Sch. Med., Univ. North Carolina, Chapel Hill, NC 27514) **Organophosphorus neuropathy. II. A fine-structureal study of the early stages of axonal degeneration.** *Am. J. Pathol.* 94(2): 253-270; 1979. (21 references)

Two young adult male cats were given a single ip dose of DFP at 40 mg/kg followed by aprotective dose of eserine add atropine. Teased nerve fibers from the distal 3 cm of the left recurrent laryngeal nerves (LRLN) animal were examined 18 days after injection. The Araldite-infiltrated LRLN revealed numerous nerve fibers undergoing wallerian-like axonal degeneration. A small number of nerve fibers had only focal axonal degeneration which was localized to one or more proximal internodes, the distal internodes appearing normal. A small number of nerve fibers displayed focal, midinternodal varicosities, which were usually limited to only one or two internodes along the individual nerve fibers. These were often unaccompanied by other nerve fiber abnormalities. The varicosities were associated ultrastructurally with intra-axonal and/or intramyelinic vacuoles. Accumulations of axonal agranular reticulum were found in all four fibers, but were associated with less than one half of the varicosities. Nerve fiber varicosities progressed to the focal, nonterminal axonal degeneration.

79-1098. Scott, E. A.; Sandler, G. A.; Byars, T. D. (Dep. Large Anim. Med. & Surg., Michigan State Univ., East Lansing, MI 48824) **Warfarin: effects on anticoagulant, hematologic, and blood enzyme values in normal ponies.** *Am. J. Vet. Res.* 40(1): 142-146; 1979. (40 references)

Ponies were given an oral loading dose of 50 mg warfarin, which was followed 24 hr later by a 25 mg dose. Thereafter a daily dose of 10 mg/day over a 10 day period was maintained. These experiments led to the establishment of a daily maintenance dose span which would affect a degree of anticoagulation in the pony. A second group of ponies was given a loading dose of 50 mg, followed 24 hr later by a 24 mg dose. The calculated daily maintenance dose was then administered once a day for 7 days. A decrease of prothombin activity was noted in all ponies. Partial thromboplastin times were increased, but the range varied considerably. A significant increase was noted in the activated coagulation times. Partial prothrombin times correlated positively with increases in prothrombin times. Fibrinogen concentrations did not undergo significant changes. Serum aspartate aminotransferase activity remained unchanged. Serum dehydrogenase activity increased in 3 of the 5 groups after several days of treatment. Complete blood count and platelet numbers did not show change.

79-1099. Gilbert, S.; Laurence, C. (Lab. Histopathol., CERTI, F-78000 Versailles, France) **Demonstration of chemical mutagenicity in laboratory animals.** *Ann. Falsif. Expert. Chim.* 71(770): 411-426; 1978. (55 references) (French)

This article evaluates the mutagenic potentialities of chemical agents through studies in vivo on laboratory mammals. The authors resort to both cytological and fecundation methods. The study of blood cells (100 cells/animal) from treated Chinese hamsters, mice and rats revealed chromosomal anomalies involving number or structure. The micronucleus test made it possible to observe the presence of Howell-Jolly bodies in bone marrow cells, especially in young, polychromatic erythrocytes. Thirty to forty days after treatment, chromosomal translocations were the most common aberration in germinal cells reaching the spermatocyte stage. The analysis of sister chromatid exchange formation at the

level of spermatogonia or bone marrow cells in male rats was also indicative mutagen test. Morphological alterations appeared in the spermatozoids treated with a mutagenic agent. Reproduction studies dealing with gene mutations were used in two methods. The dominant lethal test utilized common breed rodents. The males were treated with chemicals before mating and the mutagenic effects were determined after sacrificing the females. In the specific locus technique, treated hybrid mice (3H1) were coupled with Stock T mice carrying recessive genes. Mutations could be detected in their descendants. In their discusssion, the authors tried to assay the methods reviewed and compared their degrees of sensitivity. They noted a good correlation was obtained with the various systems of chemical testing *in vivo*. The conslusions obtained *in vivo* and *in vitro* after testing of the same substances were in general agreement.

79-1100. Goerz, G.; Vizethum, W.; Bolsen, K.; Krieg, Th. (Hautklin., Univ. Duesseldorf, D-4000 Duesseldorf 1, BRD) **Hexachlorobenzol (HCB)-bedingte Porphyrie der Ratte. Einfluss von HCB-Metaboliten auf die Haembiosynthese. [Hexachlorobenzene (HCB)-induced porphyria in rats. Effect of HCB-metabolites on heme biosynthesis.]** *Arch. Dermatol. Res.* 263(2): 189-196; 1978. (27 references) (German)

Two hundred female Wistar rats in groups of 4 were fed for a total of 80 days a diet containing either 0.05% hexachlorobenzene (HCB) or 0.05% pentachlorobenzene (PCB). Another group prior to the HCB treatment received a diet containing 0.05% PCP for 40 days and subsequently HCB for 54 days. The control group was fed a diet without the mentioned additives. HCB, PCB and PCP increased the cytochrome P450 level in the liver to approximately the same degree; the *O*-dealkylation of 7-acethoxycoumarin in the liver homogenate was increased considerably by HCB by the second day and only slightly by PCB and PCP. Since the urinary porphyrin excretion remained the same throughout the entire test period in animals fed PCB and PCP and a distinct porphyria (measured at porphyrin excretion exceeding 50 μg/day) was established after 60 days of HCB treatment, it is quite unlikely that the HCB metabolites, PCB and PCP, are porphyrogenic agents of HCB. Regardless of the PCP-pretreatment, HCB led to porphyria only after 50 days (the same as for the HCB controls). It is unlikely that the HCB-induced porphyria has a direct pathogenetic connection to the induction of the cytochrome P450 system.

79-1101. Ando, M. (Environ. Health Sci. Div., Natl. Inst. Environ. Stud., Ibaraki 300-21, Japan) **Transfer of 2, 4, 5, 2', 4', 5'-hexa chlorobiphenyl and 2,2-bis- (*p*-chlorophenyl), 1,1,1-trichloro ethane (*p,p'*DDT) from maternal to newborn and suckling rats.** *Arch. Toxicol.* 41(3): 179-186; 1978. (22 references)

Pregnant rats were givan a small dose of ^{14}C-2,4,5, 2',4',5'-hexachlorobiphenyl (HCB) and ^{3}H-DDT intraperitoneally. The transfer of HCB and DDT through the placenta and milk was then investigated. Transfer through the placenta was 2.7 and 1.5% (respectively) of the initial doses; transfer through milk was 39.2 and 21.5%. HCB is obviously more transferable than DDT through the placenta and milk, the ratio of the amount of HCB transferred through milk to the amount transferred through the plancenta agrees with that for DDT. Concentrations of HCB and DDT in the whole suckling rat increases rapidly and is similar to the sigmoidal growth curve and change in lipid concentratons. Therefore, the concentrations of the chemicals in the materal tissue generally decrease in comparison with those of nonpregnant rats. (Author abstract by permission)

79-1102. Lotti, M.; Johnson, M. K. (Mol. Toxicol. Sect., Toxicol. Unit, MRC, Carshalton, Surrey SM5 4EF, England) **Neurotoxicity of organophosphorus pesticides: predictions can be based on *in vitro* studies with hen and human enzymes.** *Arch. Toxicol.* 41(3): 215-221; 1978. (18 references)

The comparative inhibitory power of organophosphorus esters in vitro against hen brain acetylcholinesterase and neurotoxic esterase correlates with their comparative effects (death or delayed neuropathy) in vivo. Further comparisons of the in vitro effects seen with hen and human enzymes facilitates extrapolations to the human in vivo situation. (Author abstract by permission)

79-1103. Teichmann, B.; Schmidt, A. (Zentralinst. Krebsfrosch., Akad. Wiss. DDR, DDR-1115 Berlin-Buch, DDR) **Zur Prufung von *O,O*-Dimethyl (1-hydroxy- 2,2,2-trichloroethyl) phosphonate (Trichlorfon) auf kanzerogene Wirkung in syrischen Goldhamstern (*Mesocricetus auratus* Waterhouse) durch intraperitoneale Injektion. [Test of *O,O*--dimethyl (1-hydroxy- 2,2,2-trichlorethyl) phosphonate (trichlorfon) for carcinogenic activity in Syrian golden hamster (*Mesocricetus auratus* Waterhouse) by intraperitoneal administration.]** *Arch. Geschwulstforsch.* 48(8): 718-721; 1978. (7 references) (German)

Males (23) and female (25) Syrian golden hamsters were weekly injected with 20 mg TCP/kg in a 2% solution in isotonic natrium chloride for a maximum of 90 wk. The single doses were approximately 7% of the average LD50 for ip administration; the maximum total doses were 204 mg (male) and 206 mg (female). The controls (22 male and 23 female animals) were ip injected with isotonic NaCl solution. Benign and malignant tumors of different localization were found in both groups. Comparison of the total tumor incidence and of the incidence of malignant and benign tumors according to TCP-injected animals and control did not show any statistically significant differences between them. Sex did not affect this aspect of the findings. However, the survival time and the average body weight were considerably lowre in male TCP groups than in male controls.

79-1104. Drevenkar, V.; Reiner, E.; Pleshtina, R.; Wilhelm, K.; Vidachek, S. (Biochem. Lab., Inst. Med. Res. & Occup. Med., Zagreb, Yugoslavia) **Toksikologija pestitsida [Toxicology of pesticides.]** *Arh. Hig. Rada Toksikol.* 29(1): 70-74; 1978. (Croatian)

Toxicological experiment reports from the Institute

of Medical Research and Occupational Medicine for the year 1977 are given. Esterification studies of anticholinesterase organophorphorus compounds by synthetic oximes was tested. Investigations of the LD50's of new insecticides were begun. Cholinesterase levels were measured in 186 factory workers, who were exposed to organophosphates, carbamates, chlorinated hydrocarbons and herbicides, in a pesticide manufacturing plant. Examination of serum vitamin A levels, visual acuity, and psychomotor functoin were also performed. Residue levels of DDT, DDE, TDE, aldrin, dieldrin, lindane, and α-BHC were compared between a group of exposed people and a group from the general Yugoslavian population. The levels of residues found in the exposed group were generally much higher than those found in the general population. Phosalone degradation product (diethyl methyl dithiophosphate) was identified by gas liquid chromatography from the urine of exposed workers. Also discussed was the possibility of a quantitative study of organophosphorus pesticides in river water using thin layer and gas chromatography.

79-1105. DiGiovanni, J.; Berry, D. L.; Juchau, M. R.; Slaga, T. J. (Dep. Pharmacol., Sch. Med., Univ. Washington, Seattle, WA 98195) **2,3,7,8-Tetra chlorodibenzo- *p*-dioxin: potent anticarcinogenic activity in CD-1 mice.** *Biochem. Biophys. Res. Commun.* 86(3): 577-584; 1979. (24 references)

Topical pretreatment with non-toxic doses of 2,3,7,8-tetrachloro dibenzo- *p*-dioxin, a contaminant formed in the commercial synthesis of the herbicide 2,4,5-trichlorophenoxyacetic acid, (2,4,5-T), strongly inhibited the initiation of skin tumors by 7,12-dimethyl benz(a)- anthracene and benzo (a) pyrene in female CD-1 mice. 2,3,7,8- tetrachloro dibenzo- *p* -dioxin also produced marked induction of epidermal monooxygenase enzymes functional in the conversion of 7,12-dimethylbenz (a) anthracene to a variety of hydroxylated products. The time course of anticarciongenic effects resulting from pretreatment with the dioxin correlated with the magnitude of induction as well as with a significant reduction in the quantity of 7,12-dimethylbenz (a) anthracene metabolites covalently bound *in vivo* to epidermal DNA and RNA but not protein. (Author abstract by permission)

79-1106. Dodge, R. H. ; Cerniglia, C. E.; Gibson, D. T. (Dep. Microbiol., Univ. Texas, Austin, TX 78712) **Fungal metabolism of biphenyl.** *Biochem. J.* 178(1): 223-230; 1979. (27 references)

Cunninghamella elegans grown on Sabouraud dextrose broth transformed biphenyl to produce 2-, 3- and 4-hydroxybiphenyl, as well as 4,4′-dihydroxy biphenyl as free phenols. A compound tentatively identified as 2,4-dihydroxy biphenyl was also produced. When 4-hydroxybiphenyl or 2-hydroxybiphenyl replaced biphenyl as the substrate, *C. elegans* produced 4,4′-dihydrobiphenyl and 2,5-dihydroxybiphenyl respectively. The compound identified as 2,4′ -dihydroxybiphenyl was produced from both substrates. A survey of 11 species of fungi known to degrade hydrocarbons revealed two species that were comparable to *C. elegans* in their ability to convert biphenyl into free phenols. In addition to free phenolic metabolites, deconjugation experiments indicate that 44% of the known metabolites present in the culture filtrate were present in the form of conjugates. These results suggest that the transformation of biphenyl by *C. elegans* is similar to that found in mammalian systems. (Author abstract by permission)

79-1107. Nomier, A. A.; Dauterman, W. C. (Toxicol. Program, Dep. Entomol., North Carolina State Univ. Raleigh, NC 27650) ***In vitro* degradation of malathion by mouse liver.** *Biochem. Pharmacol.* 27(24): 2975-2976; 1978. (7 references)

In the presence of paraoxon and the absence of GSH, the formation of water-soluble metabolites of malathion on incubation with 100,000 *g* mouse liver supernatant fraction was completely inhibited. With the addition of GSH, 0.37 μ mole of water-soluble metabolites was formed in a 30 min period. The addition of glutathione without paraoxon had no effect on the formation of water-soluble metabolites. Dialysis of the 100,000 *g* supernatant fraction caused a slight decrease in the activity in both the presence and absence of glutathione as well as the absence of paraoxon.

79-1108. Messner, B.; Berndt, J.; Still, J. (Gesellsch. Stralen. & Umweltforsch., Inst. Toxikol. & Biochem., D-8042 Nueherberg, BRD) **Increases in rat liver cyclic AMP and glycogen phosphorylase activity caused by the herbicide atrazine.** *Biochem. Pharmacol.* 28(2): 207-210; 1979. (25 references)

The *in vivo* effects of the triazine herbicide atrazine on rat liver glycogen metabolism was investigated. After administration of atrazıne, liver c-AMP was elevated up to threefold, the activity of glycogen phosphorylase increased, the content of glycogen in the liver decreaxsed and the level of blood glucose increased. Cyanuric acid, although not a herbicide but a simple triazine, did alter neither liver c-AMP nor phosphorylase activity. *In vitro* adenylate cyclase was not activated or inhibited by triazine. However, phosphodiesterase was inhibited non-competitively by the herbicide (0.1-0.4 m*M*), resembling theophylline in this respect. When atrazine was added to isolated hepatocytes the effect of glucagon-stimulated c-AMP accumulation was potentiated. Thus, atrazine can inhibit phosphodiesterase *in vitro* and in the intact cell. This phophodiesterase inhibition may also occur *in vivo* and this may lead to the observed effects on glycogen metabolism. However, additional hormonal and/or nervous alterations caused *in vivo* by the herbicide can not be excluded. No changes in the activities of adenylate cyclase and of phosphodiesterase could be detected in response to *in vivo* administration of atrazine. However, these negative results may be the consequence of dissociation of the enzyme-atrazine complex during preparation of the liver fractions. (Author abstract by permission)

79-1109. Shu, H.; Talcott, R. E.; Rice, S. A.; Wei, E. T. (Dep. Biomed. & Environ. Health Sci., Sch. Public Health,

Univ. California, Berkeley, CA 94720) **Lipid peroxidation and paraquat toxicity.** *Biochem. Pharmacol.* 28(2): 327-331; 1979. (24 references)

Paraquat, added *in vitro*, stimulated lipid peroxidation in lung microsomes obtained from mouse lung but not from rat lung. Pretreatment of mice with *N,N*-diphenyl- *p*-phenylene diamine, an antioxidant, or a high carbohydrate diet prevented the stimulatory effects of paraquat on lipid peroxidation but did not protect the animals against the lethal effects of paraquat. Conjugated dienes were not elevated *in vivo* after a dose of paraquat in mice equivalent to twice the LD50. Plasma and lung concentrations and edemotogenic activities of paraquat and diquat were measured in rats after subcutaneous injections of these chemicals. At equimolar doses, diquat was less edematogenic and found at lower concentrations i lung than was paraquat, but considering the greater efficacy of diquat in stimulating lipid peroxidation *in vitro*. These results indicate that the effects of bipyridinium herbicides *in vitro* may not be related to their mechanisms of toxicity *in vivo*. (Author abstract by permission)

79-1110. Antunes-Madeira, M. C.; Madeira, V. M. C. (Dep. Zool., Univ. Coimbra, Coimbra, Portugal) **Interaction of insecticides with lipid membranes.** *Biochim. Biophys. Acta* 550(3): 384-392; 1979. (23 references)

The permeability of liposome membranes is increased by organophosphorus and organochlorinated insecticides at concentrations of 0.01-0.1 mM. The order of effectiveness is similar to the toxicity of the compounds to mammals and is the following for permeation of non-electrolytes and for valinomycin-induced permeation of K^+: parathion > DDT approximately equals aldrin > > malathion > lindane. The degree of effectiveness for X-537A-induced permeation of Ca^{2+} was the following: aldrin ≥ DDT > parathion >> malathion > lindane. The organophosphorus compound, ethyl azinphos (0.1 mM), dramatically increases the permeability of liposome membranes to all the tested substances, probably as a consequence of surfactant effects. Some organochlorinated insecticides appear to react with cation ionophores and modulate their motion across lipid membranes. It is suggested that the insecticides may exert some of their toxic actions by modifying certain mechanisms in the cell membrane. (Author abstract by permission)

79-1111. Lasota, W.; Stafaniak, B. (Inst. Environ. Res. & Bioanal., Acad. Med., Lodz, Poland) **Wplyw malych dawek fenitrotionu na obraz krwi obwodowej szczurow karmionych dietami o roznej zawartosci bialka. [Effect of low doses of fenitrothion on peripheral blood profile in rats fed with diets with different protein content.]** *Bromatol. Chem. Toksykol.* 10(3): 319-320; 1977. (5 references) (Polish)

Ninety Wistar rats were divided into four groups. The first group was fed standard food (21% protein); the second, third, and fourth groups received semisynthetic diets with protein contents of 25.82%, 10%, and 4.8%, respectively. All rats except controls received 0.02 LD50 doses of fenitrothon 6 times/wk for a period of 90 days. Blood for analysis was taken on the 1st, 7th, 15th, 30th, 60th, and 90th day of the experiment. No abnormal blood tests were found in the treated rats when compared to the control groups, with the exception of significant increases in the number of acidophilic cells in rats which received the low protein diet.

79-1112. Kalinowska, Z. E.; Zasadowski, A.; Przala, F. (Dep. Toxicol., Vet. Sci. Inst., Acad. Agric. Technol., Olsztyn, Poland) **Toksykodynamika dermafosu (fenchlorfosu) u owiec. [Toxicodynamics of Dermaphos (fenchlorphos) in sheep.]** *Bromatol. Chem. Toksykol.* 11(1): 1-6; 1978. (18 references) (Polish)

A single dose of 100 mg/kg of body weight of the solution of Dermaphos (98.5% pure *O,O*-dimethyl 2,4,5-trichlorophenyl, thionophosphate fenchlorphos) in oil was administered to 7 sheep. The second group of 3 sheep was treated as a control group. After 1, 2, 4, 6, 8, 16, and 32 days, blood analysis and histopathological examination were performed. The maximum decrease in cholinesterase activity was found on the sixth day of the experiment and corresponded to 77.2% of the activity in the control group. A slow increase in the activity of this enzyme was observed on the 16th and 32nd day of the experiment (93% and 97.5% relative to the control group). After administration of the insecticide, an 11% decrease in hemoglobin level and a 16% decrease in erythrocyte level were observed. The hemoglobin level was back to normal after a short period of time and the erythrocyte level was back to normal at the last stage of the experiment. The highest level (0.04 mg/kg) of insecticide residue was found on the 4th day of the experiment. Beginning from the 8th day, the level of insecticide residue decreased slowly, reaching 0.03 mg/kg on the 32nd day of the experiment.

79-1113. Peziol-Laszczynska, M. (Dep. Histol. Embryol., Inst. Biostruct., Pomeranian Acad. Med., Szczecin, Poland) **Badania wplywu insektycydow plynnych: Foschloru-50 i Metoxu-30 na obraz histologiczny i histoenzymatyczny nerki myszy bialej. [Effect of fluid insecticides: Foschlor-50 and Metox-30 on histological and histoenzymatic picture of kidney in mice.]** *Bromatol. Chem. Toksykol.* 11(1): 7-14; 1978. (21 references) (Polish)

The effect of an organophosphorus pesticide Foschlor 50 (trichlorfon) and of the chlorinated hydrocarbon Metox-30 (methoxychlor) on the morphological and histoenzymatic picture of renal tubules and glomeruli of CFW strain mice is described. Forty male CFW mice were divided into 3 groups. The first group received once a day 0.5 cm^3 of a 0.3% solution of Foschlor-50 containing 50% of technical trichlorfon. The second group received once per day 0.5 cm^3 of a 1% solution of Metox-30 containing 30% technical methoxychlor. The third group was given pure water and was used as the control group. Two kinds of experiments, a 5 day experiment and a 50 day experiment, were performed. Kidney sections from mice given Foschlor-50 showed fragmentation of brush borders, partial degeneration of glomeruli, and acidophilic albuminous masses in the lumen of some tubules.

A decrease of cytochrome oxidase and succinate dehydrogenase activities was found to occur in the short term 5 day experiment with Foschlor-50. This process was intensified in the 50 day experiment. An increase in alkaline phosphatase activity in the brush border of proximal tubule cells and in acid phosphatase activity in renal cortex tubules was noted. In studies of toxicity of Metox-30, no significant abnormalities in the morphological or hystoenzymatic picture of mouse kidney were found.

79-1114. Fingerman, S. W.; Van Meter, C.; Fingerman, M. (Dep. Biol., Tulane Univ., New Orleans, LA 70118) **Increased spontaneous locomotor activity in the fiddler crab, *Uca pugilator*, after exposure to a sublethal concentration of DDT.** *Bull. Environ. Contam. Toxicol.* 21(1-2): 11-16; 1979. (8 references)

Studies were performed to determine the effects of sublethal doses of DDT on fiddler crabs. Adult specimens were placed in bowls of sea water and all movements were recorded for a 24 hr period. The experimental group was exposed to sea water with 0.08 ppm DDT and 0.1% acetone. Controls were exposed to 0.1% acetone only. The crabs exposed to DDT demonstrated an increased level of spontaneous locomotor activity.

79-1115. Seiler, J. P. (Swiss Fed. Res. Stn., CH-8820 Waedenswil, Switzerland) **Phenoxyacids as inhibitors of testicular DNA synthesis in male mice.** *Bull. Environ. Contam. Toxicol.* 21(1-2): 89-92; 1979. (15 references)

Studies were performed in which several phenoxy-type pesticides (2,4,-D, 2,4,5-T, MCPA, and mecoprop) were given orally to mice previously treated with radioactive DNA precursors. Testicular DNA inhibition was observed to vary with the concentration of herbicide as well as with different herbicide compounds. MCPA reduced DNA synthesis the most (54%). Fifty mg/kg 2,4,5-T-isooctylester inhibited synthesis the least (1%). Inhibition by this ester was directly related to the concentration administered.

79-1116. Bildstein, K. L.; Forsyth, D. J. (Dep. Zool., Ohio State Univ., Columbus, OH) **Effects of dietary dieldrin on behavior of white-footed mice (*Peromyscus leucopus*) towards an avian predator.** *Bull. Environ. Contam. Toxicol.* 21(1-2): 93-97; 1979. (20 references)

Experiments were carried out to determine the effect of dieldrin on the antipredatory response of F_1 and F_2 cage-reared progeny of wild *P. leucopus* mice. Adult mice were fed *ad libitum* laboratory chow containing 10 ppm dieldrin. A hawk was induced to fly over an isolated test animal (a control) and the reaction to the hawk was noted. Treated mice responded by running more than controls. Some control group mice froze, but none of the treated mice froze. The behaviors of the treated mice were such that they would reduce their chances of survival in the wild.

79-1117. Turner, J. C. (Dep. Zool. & Physiol., Univ. Wyoming, Laramie, WY) **Transplacental movement of organochlorine pesticide residues in desert bighorn sheep.** *Bull. Environ. Contam. Toxicol.* 21(1-2): 116-124; 1979. (42 references)

Studies were performed on a desert bighorn and her fetus to determine the transplacental movement of organochlorine pesticide residues. Standard GLC techniques were used to identify pesticide residues in various tissues. Lindane, DDT, DDD (TDE), DDE, and PCB were detected in 14 tissues at levels from 0.01 ppm to 0.41 ppm. Highest concentrations were of PCB. The pesticides were found in both the ewe and the fetus demonstrating that these compounds traversed the placenta.

79-1118. Zitko, V.; Saunders, R. L. (Dep. Fish. & Environ. Fish. & Mar. Serv., Biol. Stn., St. Andrews, New Brunswick EOG 2XO, Canada) **Effect of PCBs and other organochlorine compounds on the hatchability of Atlantic Salmon (*Salmo salar*) eggs.** *Bull. Environ. Contam. Toxicol.* 21(1-2): 125-130; 1979. (7 references)

Studies were conducted in which the levels of various pesticides in salmon eggs were determined for several years. The level of PCBs was lower in 1975 (3.6 μg/g lipid) and 1976 (1.8-6.48 μg/kg) than in 1971 (13.7 μg). DDE levels were 0.36 μg in 1975 and 0.16 - 0.48 μg/g in 1976, compared with 2.09 μg/g in 1971. DDT and DDD (TDE) remained constant (about 0.4 μg/g). There was no apparent correlation between levels of organochlorine compounds and hatchabilities of the salmon stocks studied.

79-1119. Bursian, S. J.; Edens, F. W. (Dep. Poult. Sci., North Carolina State Univ. Raleigh, NC) **The prolonged exposure to Japanese quail to carbaryl and its effects on neurochemical and blood chemical parameters.** *Bull. Environ. Contam. Toxicol.* 21(1-2): 144-151; 1979. (21 references)

Studies were performed to determine the effects of chronic exposure of quail to carbaryl. Japanese quail were fed seven different levels (0, 50, 150, 300, 600, 900, and 1200 ppm) of carbaryl. At the end of each week for 6 wk, and after 14 wk, birds were randomly sacrificed and blood was examined. Brain, heart and adrenals were frozen and sectioned for neurochemical analysis. Whole brain dopamine levels were elevated in male quail fed 600 and 1200 ppm carbaryl for 14 wk. Whole-brain AChE activity, whole brain norepinephrin (NE), heart NE, adrenal NE and epinephrin, and plasma glucose levels were not altered by carbaryl. No effects were noted in the females.

79-1120. Sastry, K. V.; Sharma, S. K. (Dep. Zool., D.A.V. (P.G.) Coll., Muzaffarnagar (U.P.), India) ***In vivo* effect of endrin on three phosphatases in kidney and liver of the fish *Ophiocephalus punctatus*.** *Bull. Environ. Contam. Toxicol.* 21(1-2): 185-189; 1979. (18 references)

Studies were performed on the fish *Ophiocephalus punctatus* to determine the effect of endrin on the phosphatases of the kidney and liver. Fish 10-15 cm in length were placed in aquaria and treated daily with 0.03 mg endrin/l. After 20 days of treatment, the control and treated fish were collected. Kidney and liver homogenates were prepared in cold 0.25 M sucrose. Analyses were run for acid and alkaline phosphatase and glucose-6- phosphatase activity. The enzymes in the kidney showed a slight increase. In the liver, alkaline phosphatase and glucose-6- phosphatase activity was inhibited, but acid phosphatase activity was stimulated.

79-1121. Doyle, J. J.; Clark, D. E.; Norman, J. D. (Vet. Toxicol. & Entomol. Lab., Agric. Res. Serv. USDA, College Station, TX) **Effects of dietary hexachlorobenzene on distribution of some trace metals in rat tissues.** *Bull. Environ. Contam. Toxicol.* 21(1-2): 225-229; 1979. (19 references)

Male rats were fed 250 μg HCB/g diet for 30 days, after which they were sacrificed, and their livers, kidneys, spleens, and brains freeze-dried. Tissues were digested (nitric acid-perchloric acid) and examined for heavy metals by atomic absorption. Iron in the liver and kidneys was significantly less than in controls; spleen and brain Fe levels were somewhat reduced in treated animals. Copper concentrations were greatly increased in the liver. Zinc levels were significantly reduced in the liver, but were greater in the kidneys. Manganese in the liver, kidneys, and brain was significantly greater in the controls than in the treated animals.

79-1122. Knauf, V.; Hobson, W. (Int. Cent. Environ. Saf., Albany Med. Coll., Holloman Air Force Base, NM 88330) **Hexachlorobenzene ingestion by female rhesus monkeys: tissue distribution and clinical symptomatology.** *Bull. Environ. Contam. Toxicol.* 21(1-2): 243-248; 1979. (9 references)

Studies were conducted on adult female rhesus monkeys to determine the tissue distribution and clinical symptomology due to ingestion of hexachlorobenzene (HCB). Animals were fed 8, 64, or 128 mg HCB/kg body wt per day for 60 days. After 60 days, animals were sacrificed and tissues were analyzed for HCB. Weight loss, cholesterol decrease, serum potassium depression, tremors, muscular weakness, and lethargy were the reported clinical signs. HCB levels were highest in fat and bone marrow.

79-1123. Schaefer, C. H.; Dupras, E. F.; Stewart, R. J.; Davidson, L. W.; Colwell, A. E. (Mosq. Control Res. Lab., Univ. California, Fresno, CA) **The accumulation and elimination of diflubenzuron by fish.** *Bull. Environ. Contam. Toxicol.* 21(1-2): 249-254; 1979. (10 references)

Studies were performed to determine the accumulation and elimination of diflubenzuron by bluegill and crappie. Fish were held in aquaria and treated with the pesticide. In elimination studies, treated fish were placed in flow-through aquaria so the pesticide could be extracted from the water to determine the rate of pesticide elimination. Water and fish tissues were analyzed for pesticide in the treatment study. The pesticide accumulated from water into fish at levels up to 80 fold in one day's time when exposed to 10 ppb. In the exposure range 1-10 ppb, the concentration in tissues was proportional to the initial concentration. The pesticide was degraded before elimination.

79-1124. Peacock, W. L.; Flaherty, D. L.; Hoy, M. A.*; Culver, D. J. (Dep. Entomol. Sci., Univ. California, Berkeley, CA) **Evaluation of insecticides for a grape IPM program.** *Calif. Agric.* 32(12): 10-11; 1978.

In the Pacific states the spider mite, *Tetranychus pacificus* McGregor has become a menace to grape crops because some insecticides disrupt their natural control by other insect predators. The effects of insecticides to non-target beneficial populations need to be known before the chemicals are adopted for use in a particular area. The effects of permethrin and methomyl to mite populations were studied in vineyard field tests in the Dinuba and Exeter regions in Tulare County. The pesticides were applied by a dilute sprayer using 756 l/acre with control plots for each area. The amounts of active ingredients (ai) applied in the Dinuba area were 0.35 kg/acre for methomyl, and 0.01125 kg/acre and 0.0225 kg/acre for permethrin, and in the Exeter area, 0.045 kg/acre and 0.090 kg/acre for permethrin. LC50 values expressed in 2.2 kg/378 l for the toxicity of permethrin as determined in leaf dip analyses were 0.0023 for *M. occidentalis*, 0.0888 for *T. pacificius*, 0.1320 for *T. urticae*, and 0.0160 for *P. anconai*. Permethrin effectively controlled grape leafhopper at both Dinuba and Exeter at all concentrations except the 0.01125 kg ai/acre application level. It also controlled leaf folder, but showed toxicity to predatory mites and tydeid mites even at low concentrations. Methomyl also controlled grape leafhopper and certain lepidopterous insects, but with less increases in spider mite populations than were found with permethrin. Methomyl reduced the number of predatory mites, but their populations including tydeid mites, increased again in 7 to 10 days.

79-1125. Borzsonyi, M.; Pinter, A.; Surjan, A.; Torok, G. (Natl. Inst. Hyg., H-1966 Budapest, Hungary) **Carcinogenic effect of a guanidine pesticide administered with sodium nitrite on adult mice and on the offspring after prenatal exposure.** *Cancer Lett.* 5(2): 107-113; 1978. (20 references)

Adult Swiss/Leiden mice were fed LATI pelleted mouse diet ad libitum. The animals were treated intragastrically during the last week of pregnancy with dodecylguanidine acetate, DGA, a fungicide, together with 0.05% sodium nitrite. In females there was a 30-70% incidence of malignant lymphomas, lung adenomas, and hepatomas. The first tumors appeared 4 mo after delivery in the F_0 generation, and at 6 to 7 mo after delivery in the F_1 generation. Spontaneous tumors occurred in 6% of the untreated controls and only after a 10 mo period. The oncogenic activity of the DGA with sodium nitrite was dependent on the dose level of the DGA. Electron microscopy demonstrated A and C type RNA virus particles in lymphomas. DGA alone had no effect on the cancer incidence.

79-1126. Rudali, G.; Assa, R. (Equipe Rech. CNRS, Fond. Curie, Paris, France) **Lifespan carcinogenicity studies with hexachlorophene in mice and rats.** *Cancer Lett.* 5(6): 325-332; 1978. (16 references)

Fifteen male Sprague-Dawley rats were fed a synthetic diet deficient in protein and poor in vitamins into which hexachlorophene (HCP) had been incorporated at a concentration of 50 mg/kg. The average daily food intake per rat was 30 g. C57Bl mice were fed a complete standard diet to which 150 mg/kg HCP had been added and the daily average food intake per mouse was 3g. XVII/G mice were fed a standard diet containing 150 mg/kg HCP. Other XVII/G mice were given HCP in the milk from the mother animal. Other XVII/G mice were injected at birth with 3 sc injections of 0.05 mg, 0.05 mg, and 0.1 mg HCP/animal on the 1st, 2nd, and 8th days of life. Nine C57Bl females were injected on the 16th and 18th days of pregnancy with 0.5 mg/animal HCP. After a two year period no significant carcinogenic effects were noted in the Sprague-Dawley rats fed on the protein- and vitamin-deficient diet or in the C57Bl and XVII/G mice receiving HCP in their diets. No significant increase in the incidence of tumors was noted in XVII/G mice injected sc at birth or receiving HCP via the mother's milk. No carcinogenic effect was noted in (C57Bl x C3H)F1 hybrid mice who received HCP transplacentally.

79-1127. Sonstegard, R. A.; Leatherland, J. F. (Dep. Biol., McMaster Univ., Hamilton, Ont., Canada) **Growth retardation in rats fed coho salmon collected from the Great Lakes of North America.** *Chemosphere* 7(11): 903-910; 1978. (8 references)

Male Sprague-Dawley rats were fed daily 40 g of coho salmon per 100 g body weight. One group of rats were fed on fish taken from Lakes Ontario, Erie, and Michigan. A second group was fed on fish caught in the Pacific Ocean. A third group of rats received rat chow. Body weight gains in the three groups of rats were similar. Rats fed coho from Lakes Erie and Michigan had considerably lower weight gains compared to those fed coho from Lake Ontario or the Pacific Ocean. Protein, lipid, and caloric content of the coho salmon samples did not differ enough to account for the differences in weight gain. Organochlorine residues are suspect in the growth retardation recorded in rats fed diets of Lake Michigan and Lake Erie coho salmon. However, this could not be proved by the findings of this study.

79-1128. Passino, D. R. M.; Cotant, C. A. (Great Lakes Fish. Lab., US Fish & Wildl. Serv., Ann Arbor, MI 48105) **Allantoinase in lake trout (*Salvelinus namaycush*): *in vitro* effects of PCBs, DDT and metals.** *Comp. Biochem. Physiol. C.* 62(1): 71-75; 1979. (25 references)

Allantoinase, an enzyme in the purine-urea cycle, was found in livers of *Salvelinus namaychush* (Osteichthyes: Salmoniformes). The enzyme was active from pH 6.6 to 8.2 at 37°C and from pH 7.4 to 9.0 at 10°C and had an Arrhenius energy of activation of 11.0 kcal/mol and a temperature quotient of 2.0. The K*m* of the enzyme homogenate was 8.4 mM allantoin. The concentrations of inorganic metals at which 50% inhibition occurred during *in vitro* exposure were 6.0 mg/l $Cu^{2}+$, 6.7 mg/l $Cd^{2}+$, 34 mg/l $Hg^{2}+$ and 52 mg/l $Pb^{2}+$. The *in vitro* sensitivity to PCBs, DDT and DDE and kinetics in the presence of metals were determined. Allantoinase activity was negatively correlated with body length for fish from Lake Michigan but not from Lake Superior or the laboratory. (Author abstract by permission)

79-1129. Plack, P. A.; Skinner, E. R.; Rogie, A.; Mitchell, A. I. (Nat. Environ. Res. Counc., Inst. Mar. Biochem., Aberdeen AB1 3RA, Scotland) **Distribution of DDT between the lipoproteins of trout serum.** *Comp. Biochem. Physiol. C* 62(1): 119-125; 1979. (16 references)

The serum lipoproteins have been suggested as a possible transport mechanism of the lipid-soluble pesticide DDT in previously studied mammalian and fish systems. To investigate this possibility, mature female fish could be injected with the individual serum lipoproteins VLDL, LDL, HDL or EL each complexed to ^{14}C-DDT to measure the uptake of radioactive pesticide by the maturing eggs. Before such a study could be undertaken, the amount of DDT exchange occurring between the different lipoproteins should be tested by *in vitro* or *in vivo* methods. ^{14}C-DDT was added to rainbow trout (*Salmo gairdneri* Richardson) serum either as an ethanol solution or complexed to one of the serum lipoproteins VLDL, LDL, HDL or egg lipoprotein. Results of radioactivity measurements in each of the lipoprotein fractions showed that DDT is rapidly distributed amongst all of the fractions. The concentrations of DDT in μg/g lipoprotein lipid varied between the lipoprotein types, however, the proportions of the pesticide in the lipoprotein fractions remained relatively constant in all tests with mean values being in the ratios of 100:76.2:46.0 for VLDL:LDL:HDL.

79-1130. Spruit, D.; Bongaarts, P. J. M.; De Jongh, G. J. (Dep. Dermatol., Univ. Nijmegen, Nijmegen, The Netherlands) **Dithiocarbamate therapy for nickel dermatitis.** *Contact Dermatitis* 4(6): 350-358; 1978. (20 references)

A 17-yr-old female patient with a history of nickel hypersensitivity developed erythematous skin reactions, erosions and lichenification on the chin, around the eyelids, and on the skin of the trunk, back and abdomen and breasts. Vesicles were also noted between the fingers. Various treatments did not ease the situation significantly, and finally it was decided to try to decrease the nickel content of her body by oral consumption of a chelating agent, sodium diethyldithiocarbamate (DDC), in dose levels of 1.0 and 1.2 g per day. Following the dose level of 1 g DDC/day, the nickel excretion in the urine increased about tenfold. There was no increase in the nickel elimination in scalp hair. After receiving 1.2 g DDC/day for 2 mo, patch tests with nickel sulfate were still positive, even though less local therapy was needed. It is not certain as yet whether treatment with DDC was really of help in this nickel hypersensitive patient.

79-1131. Chetty, C. S.; Rajendra, W.; Indira, K.; Swami, K. S. (Dep. Zool., Sri Venkateswara Univ., Tirupati, 517502, India) ***In vitro* effects of organochlorine pesticide (DDT) on catalytic potential of SDH in gastrocnemius muscle of frog, *Rana hexadactyla*.** *Curr. Sci.* 47(22): 842-844; 1978. (12 references)

The gastrocnemius muscles of frog were excised and exposed to 20 μM of DDT. The activity levels of the succinic dehydrogenase (SDH) enzyme in the gastrocnemius muscle homogenates were determined. DDT inhibited the enzyme activity to various degrees and also altered the Michaelis-Menten constant of the enzyme. DDT increased the activation energy for the enzyme. The results of the experiment suggest decreased enzyme-substrate affinity and masking of active sites by DDT

79-1132. Sivaiah, S.; Ramana Rao, K. V. (Dep. Zool., Sri Venkateswara Univ., Tirupati 517 502, India) **Effect of malathion on the excretory pattern of the snail, *Pila globosa* (Swainson).** *Curr. Sci.* 47(23): 894-895; 1978. (9 references)

Snails were exposed to 4 liters of water containing 5 ppm malathion for 48 hr. An increase was noted in the excretory products in all tissues of the exposed snails, the increase being greatest in ammonia, less in urea, and least in uric acid. The percent increase of ammonia in all tissues and of urea in hepatopancreas tissue was found to be significant. A decrease was noted in the total protein content in all the tissues of the snails so exposed. It is suggested that the decrease in the total protein content which had been earlier reported along with stepped up amino-transferase activity may cause an increase in ammonia level in all tissues. The increased urea content suggests that some quantity of ammonia was converted to urea.

79-1133. Molnar, J.; Paksy, K. (Dep. Munic. & Public Health Inst., Budapest, Hungary) **Akut nyalkahartya-gyulladas patkanokon propaklor- es TMTD-tartalmu novenyvedoszerek szembe juttatasa es belelegeztetese utan. [Acute inflammation of rat mucosa evoked by eye instillation and inhalation of pesticide formulations containing propachlor and TMTD.]** *Egeszsegtudomany* 22(4): 393-397; 1978. (17 references) (Hungarian)

The effects of Satecid 65 WP (with 65% propachlor) and Pol-Thiuram (with 85% TMTD, thiram) on the eye conjunctiva and tracheal mucosa were studied in CFY male albino rats. Inflammation of the mucosa was visualized by the Evans blue diffusion technique. The aqueous suspensions of both substances caused conjunctivitis at a minimum concentration of 0.01%. The experiments with 4-hr dynamic inhalation of the dusts of the preparations demonstrated inflammation of the tracheal mucosa; the threshold concentrations at which inflammation was observed were $>$ 0.1 mg/m^3 for Pol-Thiuram and nearly 0.5 mg/m^3 for Satecid 65 WP. A mortality of 25% was observed following the 4-hr inhalation of 2.63 mg/m^3 of Pol-Thiuram and 3.58 mg/m^3 of Satecid 65 WP. Extended hemorrhages and frothy bloody secretion was found in the lungs and bronchi. The surviving rats became asymptomatic in 2-48 hr. The mixture of the inert ingredients of the preparations caused no inflammation of the mucosa. According to the literature data, the acute LD_{50} of Satecid 65 WP is $>$ 3,580 mg/m^3, and that of Pol-Thiuram is 2,630 mg/m^3.

79-1134. Gerasimov, S.; Dimitrov, T. (Zool. Inst., Bulg. Acad. Sci., Sofia, Bulgaria) **Kumulativen efekt i fenomen na privikvane pri beli pl'khove, tretirani s rodentitsidi. [Cumulative effect and tolerance of albino rats treated with rodenticides.]** *Ekologiya* 4: 72-78; 1978. (12 references) (Bulgarian)

The cumulative effects of rodenticides on albino rats and rat tolerance to the compounds was evaluated by tracing the pattern of intoxication under subacute laboratory conditions. The Lim method was used in the study of 120 animals which were placed in 12 equal groups with identical numbers of males and females. Two of the groups served as controls. The compounds studied were zinc phosphide, naphtox (ANTU), Ratron-G (warfarin), Racumin-57 (coumatetralyl), Tomorin (coumachlor), chlorophacinone, Carbicron (dicrotophos), toxaphene, Thiodan (endosulfan), and Gusathion 25 (azinphos-methyl). Racumin-57, Carbicron, Thiodan, and Gusathion 25 manifested an increased cumulative effect to LD50 of KK = 0.31, 0.32, 0.38, and 0.46, respectively, and to LD100 of K = 9.185, 2.526, 2.887, and 2.495, respectively. An equilibrium of cumulation and tolerance was found in zinc phosphide and Ratron-G, and a strong tolerance was established for Naphtox with KK = 3.48 for LD50 and K = 0.176 for LD100. Due to their increased tolerance above LD50, the rodenticides should be mixed with attractants.

79-1135. Hatfaludi, F.; Surewich, W.; Somogyi, J.; Karvaly, B. (Inst. Biochem., Semmelweis Univ. Med. Sch., Budapest, Hungary) **Toxicological mechanism of pesticides.** *Eur. J. Clin. Invest.* 8(5): 350; 1978.

Inhibition of various membrane-localized enzyme systems (sodium pump, mitochondrial electron transport, and substrate transport system etc.) by chlorophenoxy herbicides was found to be in the same range. The inhibitions were found to be noncompetitive by kinetic analysis. A model was proposed in which the chlorophenoxy herbicides exert a unique inhibitor effect by altering the membrane lipid structure. This suggests an interpretation of the negative temperature effect of DDT. The direct effects of the chlorophenoxy group and DDT on the structure of lipid bilayers were investigated in model systems by ESR spectroscopy. All the above compounds affected the fluidity of the hydrocarbon region of lipids in bilayer as a function of pH and concentrations. Trichlorophenoxyethanol and DDT considerably decreased membrane fluidity at physiological pH. Therefore administration of a membrane fluidizing agent might be useful in poisoning by these compounds.

79-1136. Zeyer, J.; Bodmer, J.; Huetter, R. (Mikrobiol. Inst., ETH-Zent., CH-8092, Zurich, Switzerland) **Microbial degradation of hydroxy-derivatives of *s*-triazine herbicides.** *Experientia* 34(12): 1671; 1978.

Triazines and their derivatives can be eliminated from manufacturing wastewater at present only by using expensive chemical and physical methods. Therefore a study was initiated to find microorganisms capable of degrading hydroxytriazines. Test microbes were isolated from soils with prolonged triazine application, from sewage plants of triazine manufacturing installations, and other sources. Strains were found which were able to convert *N*-isopropylammeline to *N*-isopropylammelide, *N*-ethylammeline to *N*-ethylammelide, ammeline to cyanuric acid, and cyanuric acid to CO_2 (and presumably NH_3). Dealkylation of *N*-ethylammeline and *N*-isopropylammeline was not detected. The ammeline degradation sequence can be accelerated by addition of cytosine as a nitrogen source. Cyanuric acid decomposition was most efficient in conjunction with a fungus which can use cyanuric acid as a nitrogen but not a carbon source. In addition, using this fungus, ^{14}C-cyanuric acid can be determined quantitatively in the form of $^{14}CO_2$ even in complex media without previous cleanup. Therefore it may present a useful screening tool.

79-1137. Izquierdo, J. A.; Rabiller, G.; Borghi, E.; Costas, S.; Savini, C.; Justel, E. (Cent. Estud. Farmacol. & Princ. Nat., 1428 Buenos Aires, Argentina) **Tryptophan (Trp), serotonin (5-HT), monoamino oxidase (MAO) and 5-hydroxyindole acetic acid (5-HIAA) in brain and subesophagic ganglions of earthworms. Effects of parathion.** *Experientia* 35(1): 73-74; 1979. (11 references)

Tryptophan, 5-HT, MAO and 5-HIAA were determined in the first 5 segments of earthworms (Oligochaetae) where the brain and subesophagic ganglions are located. Tranylcypromine (IMAO) decreased MAO activity increasing 5-HT and decreasing 5-HIAA. Motility and survival of worms were disturbed in Allolobophora species (young worms), parathion fumigation decreased acetylcholinesterase (AChE) activity and increased Trp, 5-HT and 5-HIAA. Motility was diminished after 24 hr, it worsened after 72, but returned to normal levels 40 to 50 days later. (Author abstract by permission)

79-1138. Konno, N.; Kinebuche, H. (Dep. Public Health, Fukushima, Med. Coll., Fukushima 960, Japan) **Accumulation of Phosvel in adipose tissue of hens.** *Experientia* 35(1): 82-83; 1979. (6 references)

Phosvel (leptophos) was given to hens of the White Leghorn strain in single oral doses of 5, 10 or 20 mg/kg for periods of 7, 14, 21, or 28 days. The birds were studied for abnormality of gait and behavior. Adipose level of Phosvel was determined by gas chromatography. No birds killed within 15 days of the beginning of treatment showed signs of ataxia or paralysis. The latent period before the onset of symptoms was calculated to be between 8 and 14 days for a single oral dose of Phosvel. Three birds that received 10 and 20 mg/kg/day of Phosvel showed signs of ataxia after 17-19 days, and paralysis after 20-22 days, and died on day 25. The level of Phosvel in adipose tissue increased accumulatively during the first 21 days, but then decreased by the termination of the experiment at day 28. The level of Phosvel in the fat was proportional to the size of the daily dose in all but the cases dosed with 20 mg/kg for 25 days. For the hens given 20 mg/kg/day for 25 days, the Phosvel concentration in fat reached its maximum level at day 25.

79-1139. Akopian, O. A.; Mendiukh, O. I. (Med. Inst., Lvov, USSR) **Vzaimodeistvie atropina s eritrotsitami krovi. [Interaction of atropine with erythrocytes.]** *Farmatsiia (Moscow)* 27(6): 43-44; 1978. (7 references) (Russian)

To evaluate an interaction between tropan alkaloids and formed elements of the blood, isolated human erythrocytes (2 ml) were incubated with 2 ml of atropine sulphate (AS: 4 mg in 1 ml of saline). The mixture was incubated at 38°C for 20 min, 1 hr, 2 hr, 3 hr, or 24 hr, and then was centrifuged at 10,000 rpm for 10 min. The content of bound and free AS was measured photometrically. It was found that the amount of AS that was bound with erythrocytes depended upon the duration of incubation, and increased from 1.5% after 20-min incubation to 39% after 24-hr incubation (15% of the AS was bound to erythrocyte membranes and 24% to Hb).

79-1140. Maslinska, D.; Zalewska, Z. (Lab. Dev. Neuropathol., Med. Res. Cent., Polish Acad. Sci., Warsaw, Poland) **Effect of dichlorvos, administered to the pregnant rabbits, on the cholinesterase activity in the progeny.** *Folia Histochem. Cytochem.* 18(4): 335-341; 1978. (23 references)

DDVP (dichlorvos) was administered in oil per os at levels of 6 mg/kg body weight by means of an esophagus tube to 6 pregnant rabbits. Long lasting changes in cholinesterase activity were noted, probably due to the direct action of the pesticide as it penetrated the placenta. Investigations showed that positive histochemical reactions occurred mainly in the grey matter of the brain. The highest enzyme activities were noted in the neuropil of caudata nucleus and putamen. Equally intensive activity was seen in the neuropil of the region of Broc's nuclei and in the rhinencephalon. The reaction in the septal nuclei was less intense. Enzyme activity in the cerebral cortex was low except in a few pyramidal neurons of the deeper layers of the sensomotor regions. AChE activity was noted in the globus pallidus, and the thalamic nuclei, in which the neurocytes were more intensely stained than the neuropil.

79-1141. Periquet, A.; Derache, R. (Groupe Rech. Toxicol. Aliments & Boissons, INSERM U87, Inst. Physiol., Univ. Paul Sabatier, F-31400 Toulouse, France) **Inflammation experimentale et taux proteique alimentaire chez des rats intoxiques subchroniquement au nabame. [Experimental inflammation and dietary protein levels in rats.]** *Food Cosmet. Toxicol.* 16(6): 575-583; 1978. (53 references) (French)

In research on new toxicity tests, attempts have been made to measure the response to an inflammatory type of attack. Groups of rats were fed diets containing various levels of protein (0, 2.5, 9, 26 and 81% casein) or a standard labora-

tory chow diet, and each group was further divided into subgroups given nabam, disodium *N,N'*- ethylene bis (dithio carbamate), at a dietary level of 0, 10, 50, 100, 500, 1000 or 2000 ppm. The inflammatory response was followed in these animals by determining the levels of total mucopolysaccharides, mucopolysaccharides containing hexuronic acid, mucopolysaccharides containing *N*- acetyl neuraminic acid, total collagen and neutrosoluble, acid-soluble, labile (at 60°C) and insoluble collagen fractions in an experimental granuloma. In animals on a normal diet, nabam administration reduced both the fresh weight of the granuloma and the levels of these different constituents, in a dose-related manner. When the protein level of the diet was reduced, the inflammatory reaction showed a corresponding decrease, an effect clearly accentuated by nabam; the lower the protein level, the lower the effective dose of nabam. Nabam affected mainly the fresh weight of the granuloma expressed in relation to body weight, the levels of mucopolysaccharides, particularly the soluble fractions, and the level and distribution of collagen. This test of experimental inflammation is a sensitive method for the early detection of a toxic effect and for relating an organism's defensive capacity to its nutritional state. (Author abstract by permission)

79-1142. Devyatka, D. G.; Postolovskaia, T. T. (N. I. Pirogov Vinnitsa Med. Inst., Vinnitsa, USSR) **Zavisimost' toksichnosti pestitsida metafosa ot dozy oblucheniya organizma ul'trafioletovoi radiatsiei. [Dependence of the toxicity of metaphos on the dose of ultraviolet irradiation of the body.]** *Gig. Sanit.* 43(9): 21-22; 1978. (Russian)

The effect of a 21-day exposure to UV radiation (0.1-3 biological doses according to Gorbachev- Dal'fel'd) on the toxicity of intragastrically administered metaphos (methyl parathion; 0.1 and 0.05 of LD50) was studied in 60 male albino rats. The toxicity was assessed from the serum cholinesterase and succinate dehydrogenase activities, reticulocyte count and organ weight coefficients. High radiation doses (up to 3) increased the toxicity of metaphos given in a dose of 0.1 LD50, but they reduced the toxicity of the smaller metaphos dose.

79-1143. Kagan, Yu. S.; Voronina, V. M.; Akkerman, G. (All-Union Sci. Res. Inst. Toxicol. Pestic. Polymers & Plastics, Kiev, USSR) **Vliyanie ftalosofa na embriogenez i ego metabolism v organizme belykh krys i ikh embrionov. [Effect of phthalophos on the embryogenesis and its metabolism in albino rats and their embryos.]** *Gig Sanit.* 43(9): 28-31; 1978. (5 references) (Russian)

The effect of phthalophos (Ph) on the embryogenesis of 13 albino rats and 650 embryos was studied to collect data concerning pesticide metabolism in animals and embryos, and the relationship between the embryotoxic properties of the compound and its dosage and reaction time. The toxin (0.3-15 mg/kg/day, 0.0002-0.1 LD50) was injected via the gastrointestinal tract for the duration of pregnancy. The effect of Ph on embryogenesis was measured after death of the embryos or by developed anomalities. Ph was found to have an embryotoxic effect in dosages non-toxic to the mother. When administered in large doses it had teratogenic features. The embryotoxic effect was due to changes in the molecular structure and to the formation of phthalomides during metabolism.

79-1144. Klots, V. I.; Babayants, R. A.; Brysin, V. G.; Safarova, A. A. (Author address not given) **O vliyanii pestitsidov na immunologicheskuiu reaktivnost' organizma zhivotnogo i cheloveka. [Effect of pesticices on immunologic reactivity of man and animals.]** *Gig. Sanit.* 43(9): 35-36; 1978. (3 references) (Russian)

Ten rabbits and 50 people were studied to determine the effect of pesticides on the immunologic reactivity of humans and animals. Two groups of five rabbits each were immunized with Brucella strain 19 (BS19) vaccine and primed with DDT. The titer of the antibodies in the blood of the animals was measured. The first group received single doses of BS19 sc, and the second group received injections with DDT (2 ml, po) two days before anti-Brucella immunization. Blood samples were taken from the ear 5, 10, 15, 20, 30, 40, 50 and 60 days later. Standard brucellosis antigen was used for a serologic reaction. The antibody titers were 1:40; 1:640, and 1:320 after 5, 15 and 20-30 days, respectively, in the first group, and 1:20, 1:160, 1:40, 1:160 and 1:40 after 10, 20, 40, 50 and 60 days, respectively, in the second group. The people were injected with a typhoid vaccine (1 ml, sc). Revaccinated after 21 days, the control group had titers at 1:310, which was 11.6 times higher than before vaccination. The titer was 1:251 5 mo later. The titers in the second group was 1:90 and 1:54 for the same periods. Antitubercular bodies, from the blood of the animals primed with DDT were given to the second group later. Their titers were 25% of the first group.

79-1145. Konstantinova, T. K.; Efimenko, L. P.; Antonenko, T. A.; Nechkina, M. A. (Sci. Res. Inst. Rural Hyg., Saratov, USSR) **Materialy k gigienicheskomu normirovaniiu gerbitsidov 2,4-D v ob'ektakh okruzhaiushchei sredy. [Data for hygienic standardization of herbicides 2,4-D in the environment.]** *Gig. Sanit.* 43(11): 9-13; 1978. (10 references) (Russian)

The embryotropic, gonadotropic, and cytogenetic effects of 2,4-D herbicides were studied for the purpose of determining allowable concentrations in the environment. The effects of 2,4-D (sodium salt), 2,4-D butyl ester, and 2,4-D octyl ester on the reproductive functions of warm-blooded animals, the basic metabolites of these compounds in experimental albino rats and their decomposition in the environment was studied. The placental transfer of 2,4-D and the possibility of its presence in animal milk were evaluated. Thin-layer chromatography was used to determine the level of 2,4-D in the environment. It has neither cytogenetic nor gonadotropic effects on male animals, however, the embryotropic effect was noted to be hazardous and selective. The maximum permissible concentration (MPC) of the compounds in water, the work area, and the daily MTD for humans were based on Lim *chr. spec.* The MTD was found to

be 0.1 mg/kg one order below the Lim *chr. integer* of 1.0 mg/kg. Safe levels were then calculated: MTD, 0.05 mg/l/day; MPC in crops, 0.04 mg/kg; MPC in water, 0.01 mg/l; and in the work area, an MPC of 0.05-0.1 mg/m³. It is suggested that further evaluation of present standards is required.

79-1146. Viter, V. F. (Sci. Res. Inst. Occup. Dis., Kiev, USSR) **Monotonnoe i intermittiruiushchee ingliatsionnoe vozdeistvie sevina na nekotorye povedencheskie reaktsii eksperimental'nykh zhivotnykh. [Continuous and intermittent effect of carbaryl on certain behavior reaction of experimental animals.]** *Gig. Sanit.* 43(11): 33-34; 1978. (4 references) (Russian)

The effect of carbaryl inhalation on 40 rats, in 4 groups, was studied. Three different schedules were used over a 4 mo period: group 1 received continuous dosing with 1 wk of priming; group 2 received intermittent dosing every other week; and group 3 received intermittent dosing every third week. The fourth group was the control. Daily exposure lasted 4 hr. Carbaryl was administered at 12.06 ± 0.34, 22.98 ± 2.74 and 32.08 ± 3.75 mg/m³ for the three schedules, respectively. The level of carbaryl in the blood was measured daily. Alcohol was given for 2-3 mo to determine what adaptive reactions would develop. The conditional reflexes at the end of the experiment were characterized by a deceleration of the nervous system in groups 1 and 2. The latent period differed from the control by 180 and 170%, respectively. The animals from these two groups also had a greater difficulty orienting themselves and were less active (up to 100%). Carbaryl in the second schedule had a more pronounced effect on the central nervous system than in the first schedule.

79-1147. Burkatskaia, E. N.; Anina, I. A.; Viter, V. F. (Sci. Res. Inst. Occup. Dis., Kiev, USSR) **Postoiannoe i preryvistoe ingaliatsionnoe vozdeistvie sevina na nekotorye reguliatornye sistemy organizma zhivotnykh. [Continuous and intermittent inhalation effect of carbaryl on regulatory systems in experimental animals.]** *Gig. Tr. Prof. Zabol.* (11): 19-22; 1978. (10 references) (Russian)

The effect of carbaryl on the most sensitive regulatory systems of the body and recommendations for an optimal application of the pesticide were studied. The activity of cholinesterase in the brain and blood serum, and the levels of adrenaline and norepinephrine were measured. The compound was used in the following schedule: group 1 received continuous dosing; group 2 received dosing for 1 wk followed by 1 wk intervals; and group 3 received dosing for 1 wk followed by 2 wk intervals. A fourth group served as controls. The animals were primed 4 hr/day/4 mo with 12.06 ± 0.3 23.0 ± 2.7 and 32.1 ± 3.7 mg/m³, respectively for the 3 groups. There were 84 rats in each group, and data were collected at 2 wk, and 1, 2, 3, and 4 mo during dosing and again 2 wk later. More intensive disturbances in the regulatory systems were found in group 2 than in 1 or 3. The optimal application for agricultural use was the schedule used on group 2.

79-1148. Pascher, F. (Dep. Dermatol., Sch. Med., Univ. North Carolina, Chapel Hill, NC) **Systemic reactions to topically applied drugs.** *Int. J. Dermatol.* 17(10): 768-775; 1978. (66 references)

Topically applied drugs can be absorbed percutaneously in sufficient amounts to cause various systemic effects. Several reports of convulsions following topical treatment with 1% lindane have been reported, but these are not well documented. However, it is not advised that this preparation be used without adequate medical supervision. it is also urged that application of the preparation should not be repeated within 4-7 day intervals.

79-1149. Amitai, G.; Ashani, Y.; Silman, I. (Israel Inst. Biol. Res., Ness Ziona, Israel) **Fluorescent organophosphates as new probes for studying the aging of inhibited acetylcholinesterase.** *Isr. J. Med. Sci.* 15(1): 89; 1979.

When acetylcholinesterase (AChE) is inhibited by certain organophosphates, such as soman and DFP, it undergoes a process called aging after which it can no longer be reactivated by compounds such as 2-PAM, pralidoxime. The aging process presumably involves the dealkylation of the bound organophosphoryl moiety, but it is not understood how this reaction inhibits the reactivation of AChE by quaternary oximes. The present study has investigated the dealkylation reaction with the use of pyrene-containing organophosphates as fluorescent probes to detect conformational changes in the organophosphoryl-AChE conjugates during reaction with organophosphate inhibitors. Inhibitors tested possessed the general formula $Pyr(CH_2)_4OP(O)(X)(Y)$ where X and Y were respectively: (I) Cl and Cl; (II) Cl and OC_2H_5, or (III) F and OC_2H_5, and reacted specifically with 11*S* electric eel AChE. It was found that AChE inhibited by II or III could be reactivated by 2-PAM, whereas AChE inhibited by I formed an aged complex that could not be reactivated. Differences were also found in both the UV and fluorescence excitation spectra between conjugates formed from the reaction of AChE with inhibitor I and inhibitor II.

79-1150. Yamamoto, T.; Egashira, T.; Kuroiwa, Y. (Dep. Biochem. Toxicol., Fac. Pharm. Sci., Showa Univ., Tokyo 142, Japan) **Effect of pretreatment with phenobarbital and adrenalectomy on toxicity of fenitrothion in male rats.** *Jpn. J. Pharmacol.* 28(Suppl.): 125P; 1978.

The effects of phenobarbital (PB), SKF 525-A and adrenalectomy on the acute toxicity of fenitrothion to male rats was investigated. Toxicity of fenitrothion was measured in terms of activity of cholinesterase. PB, when given in doses of 60 mg/kg/day for 3 days, showed no protective effect against a 24 hr administration of fenitrothion. SKF 525A at 50 mg/kg caused a slight reduction in the toxicity of fenitrothion. In adrenalectomized rats, the toxicity of fenitrothion was less than values observed in control rats. Diethyl maleate (1 mg/kg) potentiated fenitrothion toxicity by depleting glutathione in the liver with any administration. SKF 525A and adrenelectomy both inhibited the oxidative formation and decomposition of fenitrothion. It was noted that the

decomposition of fenitrothion and fenitrooxon was stimulated in proportion to the level of glutathione in the soluble fraction. These findings support the theory that the glutathione-dependent pathway is the basic mode for fenitrothion detoxication.

79-1151. Berry, E. K. M.; Allison, N.; Skinner, A. J. (Dep. Life Sci., Trent Polytech., Nottingham NG1 4 BU, England) **Degradation of the selective herbicide 2,2-dichloropropionate (dalapon) by a soil bacterium.** *J. Gen. Microbiol.* 110(1): 39-45; 1979. (28 references)

A bacterium, capable of utilizing the selective herbicide 2,2-dichloro propionate (dalapon) as sole source of carbon and energy, was isolated from soil and tentatively identified as a fast-growing species of *Rhizobium*. 2-Chloropropionate also supported good growth of the organsim but 3-chloropropionate, monochloroacetate and dichloroacetate were not utilized. Bacteria grown in the presence of either 2,2-dichloro propionate or 2-chloropropionate oxidized these compounds and a variety of non-chlorinated substrates but not monochloroacetate. Cell-free extracts of 2,2-dichloro propionate grown bacteria converted 2,2-dichloro propionate into pyruvate with the concommitant release of two chloride ions for each molecule of pyruvate formed, indicating the presence of dehalogenase activity. Dichloroacetate and 2-chloropropionate were also inducers and substrates for the dehalogenase. Monchloroacetate was a substrate for the dehalogenase but did not serve as an inducer whereas 3-chloropropionate was a non-substrate inducer. (Author abstract by permission of Cambridge University Press)

79-1152. Walters, K. A.; Dugard, P. H. (Cent. Toxicol. Lab., I. C. I. Ltd., Alderley Park, Cheshire, England) **The influence of polyoxylene ether surfactants on transport of paraquat across isolated gastric mucosa.** *J. Pharm. Pharmacol.* 30(S): 32P; 1978. (2 references)

Paraquat is normally poorly absorbed in the gastric mucosa, and was therefore used as a model substance for studies on factors governing surfactant effects on gastrointestinal absorption. The external muscle coats were rapidly removed from rabbit stomach, and the remaining mucosa and muscularis mucosa set up as a membrane between two halves of a modified Ussing type chamber. The tissue was maintained in buffer solution and its viability monitored by measuring the trans-epithelial electrical potential difference. The mucosal surface was exposed to ^{14}C-methyl paraquat in solutions of a series of surfactants covering a range of hydrophilic and alkyl chain lengths, and transport was evaluated for 3 hr. Linear accumulation of paraquat in the aerosol solution occurred with time. No evidence for active transport of paraquat was obtained. Polyoxyethylene ethers with 10 or 20 oxyethylene moieties increased paraquat transport from micellar and pre-micellar solutions. The effect is probably due to disruption of mucosal cell membrane by solubilization of membrane components.

79-1153. Solomon, S. E. (Dep. Vet. Anat., Univ. Glasgow, Scotland) **The effect of mercury ingestion on the reproductive tract of the domestic fowl.** *J. Anat.* 127(3): 655; 1978.

The effects of mercury seed dressing on avian reproduction were investigated in the light of the reported decline in reproductive activity of wild birds consuming treated seed. When White Leghorn and Shaver (light weight laying) chickens were fed seed barley dressed with Panogen (MEMA; methylmercury dicyandiamide) they laid eggs spasmodically for 6-8 days after the beginning of feeding. These eggs were all thin shelled. Subsequently reproductive activity ceased altogether. The oviducts of treated birds were greatly reduced in weight at this time, though still clearly divisible into five functionally distinct regions. The most prominent subcellular changes induced by mercury were lipid accumulation and an increase in the number of lysosomes in the tubular gland cells. These changes were first manifested in the infundibulum, tubular shell gland pouch. The ultrastructural appearance of the magnum and isthmus remained unaltered at levels < 0.2 ppm, but fat droplets appeared in the cytoplasm of the tubular gland cells of these two regions at > 0.8 ppm. The surface epithelial cells lining the oviduct were apparently unaffected by diet. Birds returned to a normal barley diet resumed laying in 2-3 wk.

79-1154. Kluwe, W. M.; McCormack, K. M.; Hook, J. B. (Dep. Pharmacol. Toxicol., Michigan State Univ., East Lansing, MI 48824) **Selective modification of the renal and hepatic toxicities of chloroform by induction of drug-metabolizing enzyme systems in kidney and liver.** *J. Pharmacol. Exp. Ther.* 207(2): 566-573; 1978. (50 references)

ICR mice were treated with phenobarbital (PB), 3-methylcholanthrene (3MC), TCDD or PCB. Renal and hepatic microsomal enzyme activities were increased by 3MC, TCDD and PCB. Hepatic, but not renal, microsomal enzyme activities were increased by PB. Toxicity of chloroform to the liver was increased by PB pretretment. Pretreatment with TCDD, however, decreased hepatotoxicity of chloroform. No effect of chloroform toxicity to the liver was noted by pretreatment with 3MC or PCB's. Renal toxicity of chloroform was reduced by TCDD or PCB pretreatment, but no effect by PB was noted on kidney damage caused by chloroform. These results suggest that the chloroform metabolites ultimately responsible for renal and liver damage are not generated at a common site. The metabolite probably responsibe for liver damage is apparently generated in the liver, and similarly, the one responsible for kidney damage, in the kidney.

79-1155. Pipy, B.; Beraud, M.; Gaillard, D. (Groupe Rech. Toxicol. Aliments Boissons, INSERM U. 87, Inst. Physiol., F-31400 Toulouse, France) **Relation entre l'inhibition phagocytaire du systeme reticuloendothelial du rat et l'effet anticholinesterasique d'un insecticide, le carbaryl. [Relationship between phagocyte inhibition in the rat reticuloendothelial system and the anticholinesterase effect of an insecticide, carbaryl.]** *J. Physiol. (Paris)* 74(4): 379-385; 1978. (23 references) (French)

The phagocytic activity of the reticuloendothelial system (RES) and the blood cholinesterase activity were determined in male rats following iv administration of carbaryl and its metabolite, 1-naphthol. The compounds were administered at 1.875, 3.75, 7.5 and 15 μmol/100 g body weight weight, and measurements were performed at 1, 24, 48 and 72 hr after administration of test compounds. The RES phagocytic activity, assessed via the clearance of colloidal carbon, was inhibited after carbaryl administration, except at the lowest dose. The length of blockage depended on the dose administered. Phagocytic activity returned to normal within 72 hr after carbaryl administration. The spleen weight and protein content were reduced in conjunction with the RES blockage. The anticholinesterase effect was manifested within 1 hr after administration of carbaryl at any dosage. However, 1-naphthol had no effect on any of the factors investigated. The results suggest that carbaryl may inhibit some esterases of macrophages, thus interfering with phagocytosis.

79-1156. Matsuoka, L. Y.; Vahl, R. (Div. Dermatol., Cook Cty. Hosp., Chicago, IL 60612) **Scabies - a review.** *J. Am. Med. Wom. Assoc.* 33(12): 504-506; 1978. (7 references)

The United States is believed to be undergoing a scabies epidemic which started in about 1973. Such epidemics usually last about 15 yr, with 15 yr intervals between them. Therefore this disease should be suspected in any person with a widespread pruritic skin irritation. Diagnosis is confirmed by finding the mite upon medium or high power microscopic examination of skin scrapings. Treatment comprises topical application of γ-hexachloro cyclohexane (lindane), crotamiton, sulfur or benzyl benzoate. Lindane is available in a 1% lotion or cream, which is applied over the entire body except for the face and meatus, and left on for 24 hr. One treatment is usually sufficient. Adverse effects of lindane have been reported upon prolonged use or accidental ingestion. Convulsions have occurred in children, usually after excessive use. Therefore other available treatments may be preferred in children and pregnant women.

79-1157. Lee, C. C.; Russell, J. Q.; Minor, J. L. (Pharmacol. & Toxicol., Midwest Res. Inst., Kansas City, MO 64110) **Oral toxicity of ferric dimethyldithiocarbamate (ferbam) and tetramethylthiuram disulfide (thiram) in rodents.** *J. Toxicol. Environ. Health* 4(1): 93-106; 1978. (20 references)

Young rats (120-190 g) and mice (20-30 g) were exposed to acute, subacute, and chronic oral doses of ferbam, thiram, zineb, or maneb. The acute oral toxicities of ferbam and thiram were higher than zineb (LD50 values in male rats 3.4, 4.0, and 8.2, respectively); maneb was relatively non-toxic (LD50 > 8.0). Female rats were more susceptible to ferbam and thiram than males. The fungicides caused ataxia and hyperactivity, followed by inactivity, loss of muscular tone and alopecia. Most deaths occurred 1-2 days after zineb or maneb, and 2-7 days after ferbam or thiram administration. The subacute toxicity of 23, 66, or 109 mg/kg/day ferbam significantly reduced weight gains and food consumption in male rats. Mortality was 100% when 331 mg/kg/day was given to rats for 1 wk. Thiram intake of 30, 58, or 132 mg/kg/day also significantly reduced weight gain or food consumption in male rats. Long (80-wk) chronic ferbam oral toxicity studies resulted in lower weight gains in both sexes of rats, increased spleen and testes weights in males fed 37 and 96 mg/kg/day ferbam, and squamous metaplasia in the thyroid, and fatty infiltration in the pancreas. The severity and incidence of these lesions was dose-related. Similar effects were noted in animals fed 20 and 52 mg/kg/day thiram for 80 wk. Ferbam and thiram did not alter the occurrence or latent period of spontaneous tumors seen in control rats.

79-1158. Nelson, J. A.; Struck, R. F.; James, R. (Dep. Pharmacol. & Toxicol., Med. Branch, Univ. Texas, Galveston, TX 77550) **Estrogenic activities of chlorinated hydrocarbons.** *J. Toxicol. Environ. Health* 4(2-3): 325-339; 1978. (64 references)

Among the DDT analogs, *o,p'*-DDT and its metabolites have been found to be particularly estrogenic. Interaction of DDT analogs with the estrogen receptor protein have been shown in immature rats. *In vivo* treatment of these animals with *o,p'*-DDT and other active analogs reduced ^{3}H-estradiol uptake by the uterus. The interaction with the estrogen receptor was further shown in studies with MER-25 or Actinomycin-D (agents that interfere with estradiol activity) which prevented the estrogen-like effects of *o,p'*-DDT on immature rat uterus. Metabolism of DDT is not required for interaction with estradiol receptor from rat uterus or human tissue. The interaction receptor may be self-potentiating, perhaps by inhibiting steroid synthesis, or enhancing its metabolism. *o,p'*-DDT appeared to be neither estrogenic nor antiestrogenic in an *in vitro* estrogen assay. Although it inhibits binding of estradiol to the estrogen receptor from rat or human at low levels *in vitro*, higher levels are required to inhibite nuclear binding of ^{3}H estradiol in incubated whole uteri. Methoxychlor is relatively inactive as an inhibitor of ^{3}H-estradiol binding *in vitro*. Metabolism of methoxychlor is apparently needed for its estrogenic activation.

79-1159. Del Pup, J. A.; Pasternack, B. S.; Harley, N. H.; Kane, P. B.; Palmes, E. D. (Inst. Environ. Med., New York Univ. Med. Cent., New York, NY) **Effects of DDT on stable laboratory mouse populations.** *J. Toxicol. Environ. Health* 4(4): 671-678; 1978. (17 references)

Two populations of random-bred mice, and two populations from a cross of 4 pure strains were established for 4.5 yr prior to the study. One group from each stock was exposed to 100 ppm DDT in the diet for 70 wk; the other two served as controls. Neonatal survival as affected by the presence of DDT was measured by viability, lactation, and 30 day survival indices. Significant decreases ($P < 0.05$) in neonatal survival (lactation index) were noted in one exposed group by wk 20, and in the other experimental group by wk 30. This deleterious effect continued through each succeeding generation. However, improved post-weaning survival of DDT-fed mice was noted. These seemingly contradictory results may result from a selection for DDT-resistant animals,

such that DDT-susceptibile neonates were killed while the resistant mice, survived better than their control counterparts. There were no significant histopathological differences between 55-wk-old test and control groups.

79-1160. Bulger, W. H.; Muccitelli, R. M.; Kupfer, D.* (Worchester Found. Exp. Biol., Shrewsbury, MA) **Interactions of methoxychlor, methoxychlor base-soluble contaminant, and 2,2-bis (*p*- hydroxyphenyl)- 1,1,1-tri chloroethane with rat uterine estrogen receptor.** *J. Toxicol. Environ. Health* 4(5-6): 881-893; 1978. (28 references)

Uterine cytosol preparations from 20-28 day female Sprague-Dawley rats were incubated with various concentrations of laboratory grade methoxychlor (99% pure), base-washed methoxychlor, and with 2,2-bis (*p*-hydroxyphenyl)- 1,1,1-trichloroethane (HPTE) to test their ability to compete with ^{3}H- estradiol- 17β for specific binding to the cytosol estrogen receptor. The binding was determined on 10-30% sucrose gradients and by a dextran-coated charcoal assay, followed by Scatchard plot analysis. Pure methoxychlor, but not base-washed methoxychlor, suppressed ^{3}H- estradiol- 17β (^{3}H-E_2) binding to the 8*S* estrogen receptor. Scatchard plot analysis indicated that the laboratory grade-induced inhibition was competitive in nature and not caused by receptor destruction. Incubation with HPTE, an *in vivo* metabolite of methoxychlor, resulted in a marked suppression of ^{3}H-E_2 binding in the 8*S* region of the gradients. HPTE did not decrease the number of E_2 binding sites, but competitively altered the affinity of binding to the receptor.

79-1161. Reuber, M. D. (Frederick Cancer Res. Cent., NCI, Frederick, MD) **Carcinogenicity of Kepone.** *J. Toxicol. Environ. Health* 4(5-6): 895-911; 1978. (7 references)

Studies concerning the carcinogenicity of Kepone (chlordecone) are reviewed. Osborne-Mendel rats ingesting high doses of Kepone developed epistaxis and bleeding of the eyes, and died early in the NCI study. Average survival times of rats ingesting 24 ppm Kepone were 91.6 wk (range 51-109 wk). Kepone induced malignant tumors in the livers of rats and mice in the NCI study, and in the livers of rats in the Med. Coll. of Virginia study. Malignant tumors (carcinomas, sarcomas, and nodules) developed in other organs, including the thyroid glands (male and female rats), pituitary carcinomas (male and female rats), and mammary gland carcinomas in females. Interstitial fibrosis of kidneys, polyarteritis of the mesenteric, and atrophy of the testes were also noted, particularly in males.

79-1162. Haseman, J. K.; Hoel, D. G. (Biom. Branch, NIEHS, Research Triangle Park, NC) **Statistical design of toxicity assays: role of genetic structure of test animal population.** *J. Toxicol. Environ. Health* 5(1): 89-101; 1979. (17 references)

Statistical analyses of strain-to-strain variability to cancer susceptibility among mice, and their effect on long term carcinogenicity studies are discussed. Evidence for within-study strain- to-strain variability in response to several compounds was found in C57BL/6 x C3H/Anf, and C57BL/6 x AKR mice. PCNB (quintozene) and Strobane (terpene polychlorinates) produced hepatomas in less than 13% of C3H/Anf origin mice but induced cancer in 60% in the AKR strain. Among-strain differences in long term carcinogenic studies with DDT were also found. Strong effects of DDT on liver tumors were noted in BALB/c and CF-1 mice, but not in A-strain animals. Conversely, most studies with CF-1 and A-strain mice showed no DDT-induced lung tumors, while BALB/c animals exhibited marked increases in lung tumor incidence. In many cases tumor increases can be detected more readily by studying several inbred mouse strains rather than a single outbred stock.

79-1163. Kruglov, Yu. V.; Gersh, N. B.; Mikhailova, E. I.; Paromenskaya, L. N.; Shtal'berg, M. V.; Kirienko, V. P. (All-Union Sci. Res. Inst. Soil Microbiol., Moscow, USSR) **Vliianie izofosa-3 na mikrofloru pochvy i biokhimicheskie protsessy v nei. [Effects of isophos-3 on soil microflora and their biochemical processes.]** *Khim. Sel'sk. Khoz.* 16(8): 70-72; 1978. (9 references) (Russian)

The effect of isophos-3 on soil microflora and their biochemical processes were studied. Grey, medium loamy (0.85% humus, pH 7.2), chernozem - medium loamy (4.3% humus, pH 7.8), and soddy-podzolic, light-textured, loamy (3.6% humus, pH 6.2) soil was used in the experiment. The soil was moistened to 60% of full water capacity, and then fertilized (0.3-1,300 mg/kg of soil). Samples were kept in a temperature controlled chamber for 30 days at 28°C. The microbiological analyses were done on the 5th and 20th days. Isophos-3 was found to be harmless to the activity of heterotrophic microflora and their nitrogen transformation processes. The herbicide was toxic to many algae except the blue-green varieties which led to their increased numbers.

79-1164. Rennie, R. J. (Dep. Soil Sci., Univ. Minnesota, St. Paul, MN) **Immunofluorescence detection of *Nitrobacter* in soil during NO_2- oxidation in the presence of exotic chemicals.** *Microbios Lett.* 6(21): 19-26; 1977. (11 references)

Immunofluorescence techniques were employed to study the impact of potential nitrification inhibitors on *Nitrobacter winogradskyi* (strains agilis and winogradskyi) populations actively oxidizing NO_2-. Ten and twenty ppm of the biocides heptachlor, lindane, dieldrin, TDE, thiourea, and N-Serve (nitrapyrin) were mixed individually with 50 ppm $NaNO_2$ in *Nitrobacter* activated Waukegan soil. Ten ppm nitrification inhibitors N-Serve, AM (2-amino- 4-chloro- 6-methyl pyrimidine), ST(2-sulfanilimidothiazole), and tannic acid were mixed with 100 ppm $NaNO_2$ in soil actively oxidizing NO_2-. Over a 21-day period, 10 and 20 ppm levels of all biocides had either no effect or stimulated NO_2- oxidation relative to the control. Twenty ppm biocide levels resulted in lower populations of *Nitrobacter* than 10 ppm treatments. Twenty ppm lindane, dieldrin, and heptachlor reduced bacterial populations by 41, 40, and 25%, respectively, over a 21-day period. Commercial nitrification inhibitors

exerted only a small effect on bacterial multiplication or NO_2^- oxidation. Winogradskyi strain multiplication was slightly inhibited but only for 2-5 days. There was no significant effect on agilis strain populations.

79-1165. Bridges, B. A. (M.R.C. Cell Mutat. Unit., Univ. Sussex, Falmer, Brighton BN1 9QG, England) **On the detection of volatile liquid mutagens with bacteria: experiments with dichlorvos and epichlorhydrin.** *Mutat. Res.* 54(3): 367-371; 1978. (8 references)

The sensitivity of *E. coli* to highly volatile mutagens can be enhanced if the bacteria can be exposed to the mutagen for as long as possible without excessive volatilization of the test substance. Incorporation of dichlorvos into semi-enriched agar plates showed that the pesticide was detectable with *E. coli* WP2 at 5 μg/ml levels; concentrations of 1500 μg/l air were barely detectable on filter paper or watch glass. When epichlorhydrin is incorporated in agar, a dramatic increase in sensitivity is observed. Concentrations of μg chlorhydrin/ml agar yielded 600 sensitive colonies of *S. thyphimurium* TA1535.

79-1166. Nagamatsu, K.; Kido, Y.; Urakubo, G.; Aida, Y.; Ikeda, Y.; Suzuki, Y. (Natl. Inst. Hyg. Sci., Tokyo, Japan) **Absorption, distribution and excretion of triphenyltin acetate and stannic chloride in the guinea pig.** *Nippon Eiseigaku Zasshi (Jpn. J. Hyg.)* 33(3): 486-496; 1978. (21 references)

The absorption, distribution and excretion of tin compounds were studied in guinea pigs in a series of experiments. Percutaneous application of ^{113}Sn- triphenyltin acetate (^{113}S-TPTA) resulted in 3.04% and 7.97% of the dose being absorbed through the skin, while 16.3% and 12.4% were found in the application area 1 and 2 days after treatment, respectively. Radioactivity was found in the liver, kidney, and brain in large amounts following sc injection of ^{113}S-TPTA, although absorption proceeded slowly from the injection site. About 83% of the dose was eliminated through the feces within 20 days of treatment, and the body biological half time of the compound was estimated at 9.4 days. The bones and kidney showed the greatest concentration of radioactivity after an sc injection of $^{113}SnCl_4$, however no transfer of radioactivity to the brain was detected. Absorption from the injection site and excretion (mainly urinary) were slow, and the biological half time was estimated at 26.5 days. The intact compound ^{113}Sn-diphenyltin and ^{113}Sn-monophenyltin were the only radioactive tin compounds identified in the feces after an sc dose of ^{113}S-TPTA.

79-1167. Ubuka, M. (Dep. Ophthalmol., Tokushima City Hosp., Tokushima, Japan) **[Changes of electro-retinogram (ERG) of albino rabbits administered an organophosphorus insecticide for one year.]** *Nippon Ganka Gakkai Zasshi (Acta Ophthalmol. Jpn.)* 83(1): 99-104; 1979. (34 references) (Japanese)

Changes in the ERG of albino rabbits given fenitrothion po (1 or 10 mg/kg/day) as aqueous solutions for 1 yr were observed every 2 wk. Results showed a prolonged peak time of the a_1-wave from the 2nd wk of the experiment until 1 yr at both dose rates. The peak time of the O_1-wave was shortened between 2 wk and 7 mo after the beginning of the fenitrothion treatment, however, it returned to normal after 8 mo to 1 yr. No differences were observed in the ERG changes of the two dose groups. These findings suggest that the measurement of peak time of the a-wave in the electroretinogram may be a useful indicator of intoxication due to organophosphorus pesticides.

79-1168. Asanuma, N.; Suzuki, A.; Kurosawa, K.; Abe, E.; Sasaki, K. (Nippon Inst. Rural Med., Saku Gen. Hosp., Usuda, Nagano, Japan) **[Experimental studies on the organophosphorus pesticide residues in living bodies.]** *Nippon Noson Igakkai Zasshi (J. Jpn. Assoc. Rural Med.)* 27(4): 772-781; 1978. (17 references) (Japanese)

After forced administration of a single oral dose of fenitrothion to rats (300 mg/kg), the maximum concentrations of the pesticide appeared in the blood, brain, liver, and kidney on the 1st day. The fenitrothion concentrations showed rapid reduction from the 2nd day, and the pesticide was not detected on the 10th day. The ChE activity showed maximum reduction on the 2nd day, and took 15 to 30 days to attain original levels. After the forced administration of a single oral dose of 2 mg/kg of fenitrothion to rhesus monkeys, the residues in organs, and ChE activity showed a pattern similar to that observed in the rats. Urinary metabolites showed a significant correlation with the tissue residues. After forced po administration of 5, 10, 15, or 20 mg/kg of a single dose of leptophos to chickens, the adipose tissue residue persisted longer than that observed for similar doses of fenitrothion, and leptophos was still detected on the 20th day after treatment.

79-1169. Horiguchi, Y.; Asanuma, N.; Abe, E.; Kurosawa, K.; Sasaki, K.; Suzuki, A.; Yanagisawa, T. (Nippon Inst. Rural Med., Saku Gen. Hosp. Usuda, Nagano, Japan) **[Studies on the effects of organophosphorus pesticides to the central nerve system. Second report.]** *Nippon Noson Igakkai Zasshi (J. Jpn. Assoc. Rural Med.)* 27(4): 782-790; 1978. (10 references) (Japanese)

The EEG of brain cortex and inner brain and ECG were recorded for rabbits given acute doses of dichlorvos, vamidothion, or leptophos. Vamidothion and dichlorvos caused a rapid onset of bradycardia and arrhythmia in the ECG, and persistance of awake waves during recovery from the smaller dosage levels. Unrecoverable bradycardia with gradually flattened EEG resulting in brain-death preceding heart-death occurred at large dose levels. Leptophos caused intermittent appearance of paraoxysmal abnormal waves long after its administration, with the appearance of similar abnormal waves in the hippocampus and lenticular nucleus in some cases. The EEG, ChE activity, and general status of rhesus monkey administered a small dose of fenitrothion ten times at ten day intervals were observed. Slow waves appeared in the EEG from 3 hr to one day after every dose with

recovery after 2 days. However, the appearance of slow waves persisted after the 8th dose. Leptophos, at the same dose schedule, caused abnormal paraoxysmal waves in rhesus monkeys, which appeared from 72 days after the start of treatment, and remained fixed thereafter. ChE activity in the leptophos-treated monkeys showed first a reduction, and then a recovery from the 2nd day, but it did not recover to the initial level after 5 doses, which was also the case with dichlorvos. The EEG, ChE activity, and neurological picture of farmers engaging in pesticide application for long periods of time were also investigated. A relatively high rate of appearance of slow alpha activity in the EEG was found in males. Plasma ChE activity was found to be highly reduced in both males and females, but no unusual findings were observed in the neurological examinations.

79-1170. Suzuki, A.; Asanuma, N.; Abe, E.; Kurosawa, K.; Sasaki, K.; Shimazaki, K. (Nippon Inst. Rural Med., Saku Gen. Hosp., Usuda, Nagano, Japan) **[Electron-microscope studies on the acute toxicity tests of organophosphorus pesticides.]** *Nippon Noson Igakkai Zasshi (J. Jpn. Assoc. Rural Med.)* 27(4): 791-799; 1978. (7 references) (Japanese)

Groups of male Wistar rats, given 300 mg fenitrothion/kg body weight per os, were sacrificed on 1, 2, 3, 10, 15 and 30 days after dosing. The change in the structure of the eye muscles were observed by light and electron microscopy. Residues of fenitrothion decreased to undetectable levels as time progressed. Cholinesterase activity returned to normal by day 10. Major changes, noted after 5 days administration, were distension of the junction fold and reduction of the number of synaptic vessicles. When fenitrothion was administered with dichlorvos (30 mg AI/kg), the junctional fold thickened and the synaptic membrane fragmented, indicating a synergistic effect. Similar studies were performed on rats administered leptophos (5, 10, 15, or 20 mg/kg). The animals were sacrificed 2, 5, 10, and 20 days after administration and changes in the eye muscles noted. A reduction in the number of synaptic follicles and atrophy of the mitochondria of the external eye muscles were observed in the 15 and 20 mg/kg groups. Degeneration of the vacuoles was found to occur in the junctional fold by days 10 and 20. None of the findings were attributable to delayed neural toxicity.

79-1171. O'Brien, R. D.; Hilton, B. D. (Sect. Neurobiol. & Behavior, Cornell Univ. Ithaca, NY) **The effect of DDT and its analogs on the fragility of human erythrocytes.** *Pestic. Biochem. Physiol.* 9(3): 231-236; 1978. (11 references)

The effects of DDT and 8 analogs on human erythrocytes were studied by adding 10-100 μl portions of each compound to RBC suspensions. The final concentrations ranged from 10 n*M* to 10 c*M*. Molar concentrations necessary to produce 60% hemolysis ranged from 37 m*M* for DDA to 7.5 μ*M* for *p,p'*-HO-DDT (1,1,1- trichloro- 2,2- bis (*p*-hydroxy phenyl) ethane). Experiments with cockroach sensory nerves and crayfish axons showed no correlation between antihemolytic potency of the compounds and neurotoxicity.

79-1172. Mitchell, S. C.; Waring, R. H. (Dep. Biochem., Univ. Birmingham, Birmingham B15 2TT, England) **The metabolism of *cis*-2,5- dimethyl pyrrolidine- 1-carboxanilide in rodents.** *Pestic. Sci.* 9(5): 393-401; 1978. (34 references)

The metabolism of *cis*-2,5- dimethyl pyrrolidine-1-carboxanilide was studied in rats, rabbits, guinea-pigs and mice. The major metabolite in all species was *cis*- 4'-hydroxy-2,5-dimethyl pyrrolidine- 1-carboxanilide, both free and as glucuronide and sulphate conjugates. About 95% of the compound was absorbed from the gut; over a 3-day period, about 50% of the administered dose was excreted in urine and about 27% in feces. (Author abstract by permission)

79-1173. Van Auken, O. W.; Hulse, M. (Div. Environ. Sci. & Eng., Southwest Res. Inst., San Antonio, TX 78284) **Translocation and metabolism of leaf applied hexachlorophene in peanuts.** *Physiol. Plants* 44(3): 205-214; 1978. (29 references)

Peanut plants (*Arachis hypogea* L., Spanish type) were treated with ^{14}C ring-labeled hexachlorophene (HCP) for periods ranging from 0 to 114 days. HCP at a concentration of 113.3 μg in absolute ethanol was carefully applied to the center of a leaflet and allowed to dry for 10 min. Plants were harvested on days 0, 3, 7, 14, 21, 28, 35, 42, 76, or 114. Plant tissue showed no evidence HCP translocation. No HCP metabolites were found. HCP was lost to some extent from the leaves. After the 114 day period an average of 68% of the applied HCP remained unaltered on the treated plants. The mechanism responsible for altering the HCP on the treated plants appeared to be ultraviolet photolysis. Liquid chromatography mass spectral analysis was used to determine two photolysis products. Twelve other electrophylic compounds were found in various treated plant or control extracts.

79-1174. Bankowska, J. (Natl. Inst. Hyg., Warsaw, Poland) **Objawy porfirii a aktywnosc mikrosomowych enzymow watroby szczurow pod wplywem podawania szesciochlorobenzenu. [Signs of porphyria and microsomal enzyme activity in rat liver after administration of hexachlorobenzene.]** *Rocz. Panstw. Zakl. Hig.* 29(5): 517-525; 1978. (20 references) (Polish)

Two separate experiments were performed to investigate the action of hexachlorobenzene (HCB) on the liver microsomal enzyme activity of rats. In the first experiment single doses of hexachlorobenzene solution in olive oil were administered orally to 30 female rats. Four groups of animals received 5, 10, 100, and 500 mg of HCB/kg of body weight. The controls received pure olive oil only. Twenty-four hr after administration of HCB the animals were killed and the activity of AHH, AH, UDP-GLUC, and δ-ALA-S was determined. Statistically significant increases in AHH and AH activity were found in the two groups of rats which received the highest doses of HCB. HCB also caused slight increase in UDP-GLUC activity. δ-ALA-S activity was very low and no significant differences between the groups were observed. In the second experiment, 60 female rats were divided into 4 groups. Three groups were given food containing 50, 250,

or 1250 mg of HCB/kg of body weight. The fourth group was given food without HCB. One, two, and three mo from the beginning the experiment, 5 animals of each group were killed. The activity of AHH and NADH in the liver and the level of coproporphyrins and uroprophyrins in urine were determined. After 3 mo, a 9-fold increase of AHH activity was observed in the group which received the highest doses of HCB. A 3-fold increase in NADH activity was found for the same group. Systematical dose dependent increases in coproporphyrins and uroporphyrins were also observed.

79-1175. Tyrkiel, E.; Palut, D.; Cybulski, J. (Inst. Toxicol. Health, Natl. Inst. Hyg., Warsaw, Poland) **Mutagenne oddzialywanie *N*- nitrozopochodnych insektycydow karbaminianowych (karbarylu i propoksuru) na komorki szpiku kostnego ssakow. [Mutagenic action of *N*-nitroso derivatives of carbamate insecticides (carbaryl and propoxur) on mammalian cells.]** *Rocz. Panstw. Zakl. Hig.* 29(5): 527-532; 1978. (12 references) (Polish)

N-Nitrosopropoxur and *N*-nitrosocarbaryl were synthesized by standard methods. IR spectroscopy and elemental analysis were used to confirm high purity of the products obtained. *N*-nitrosopropoxur was mixed with oil from olives and administered orally to male Wistar rats at doses of 100, 200, and 300 mg/kg of body weight. Control rats received the oil vehicle alone. Six, 24, and 48 hr later the bone marrow was isolated from the femoral bones of test animals. The number and appearance of polychromatic and normochromatic erythrocytes were estimated. No induction of chromosomal aberrations was observed in either group of animals. *N*-nitrosocarbaryl mixed with olive oil was administered by ip injection to male mice at doses of 50, 100, and 150 mg/kg of body weight. Controls received the olive oil alone. Three hr before autopsy, half of the animals from each group received 2 mg/g of colchicine. Bone marrow was isolated and investigated for the presence of Jolly's bodies. No induction of chromosomal abberations was found. It is suggested that additional experiments with repeated administration of maximum tolerance doses of the insecticides be performed.

79-1176. Miura, H.; Ohmori, S.; Yamakawa, M. (Dep. Hyg., Kumamoto Univ. Med. Sch., Kumamoto 860 Japan) **Are chlorinated phenols capable of inducing hepatic porphyria?** *Sangyo Igaku (Jpn. J. Ind. Health)* 20(3): 162-173; 1978. (14 references)

Since the finding of a high incidence of porphyria cutanea tarda among workers in a plant producing 2,4-D and 2,4,5-T, these compounds have been suspected of inducing this disease. In the present experiments 2,4-D, 2,4,5-T, and PCP were fed to rats in doses of either 200-1000 mg/kg/day for 3 wk or 10 mg/rat/day for 17 wk to test the effects of these compounds on porphyrin metabolism. A decrease in urinary excretion of ALA and coproporphyrin was noted in rats from both dose groups. No uroporphyrinuria was found in any of the treated rats. No significant increases in urinary PBG or fecal prophyrin was found over control levels, and no abnormal storage of prophyrins in liver or kidneys was found. Histological findings showed only slight damage to the liver of treated rats, with vacuole degeneration and intralobular leucocytic infiltration found in about 50% of the animals. From these results it was deduced that the polychlorinated phenols have little effect on the metabolism of porphyrins, and it is unlikely that they are involved in the inducement of porphyria cutanea tarda. It is suggested that precautions should still be taken when working with these chemicals because there is the possibility that hepatotoxicity may occur from exposure to their synthesis reagents, such as the chlorinated benzenes and tetrachloro dibenzo- *p*-dioxin.

79-1177. Kudo, Y.; Nakamura, I.; Nishida, N. (Sch. Hyg., St. Marianna Med. Coll., Kawasaki, Kanagawa, Japan) **[Changes of erythrocytic cells in the peripheral blood of rabbits loaded with several pesticides.]** *Sangyo Igaku (Jpn. J. Ind. Health)* 20(6): 543-544; 1978. (Japanese)

White male rabbits were injected (sc) with 0.1 LD50 formulations of methomyl, chlordimeform, chlorbenzilate, thiophanate-methyl, or butachlor or with a 0.05 LD50 formulation of *p*-nitrophenyl trichlorophenyl ether, once a day for 5 days. Blood cell changes were observed. An increase of reticulocytes from day 2 of loading was noted with chlorbenzilate, thiophanate-methyl, or the ether. Basophil punctate erythrocytes appeared from day 4 of loading with all pesticides tested. Dynamic changes of the erythrocytic membrane was observed by the CPC method after the active ingredient of chlorbenzilate, thiphanate-methyl and butachlor were injected at a dose of 0.005 LD50. The appearance of juvenile erythrocytes was the major change noted.

79-1178. Nishimura, M.; Kaneko, Y.; Sakama, H. (Sch. Hyg., Tokyo Dent. Coll., Tokyo, Japan) **[Inhalation toxicity of organophosphorus pesticides. Part III.]** *Sangyo Igaku (Jpn. J. Ind. Health)* 20(6): 548; 1978. (Japanese)

Acute inhalation testing of a mixed formuation of 45% fenitrothion and 30% *o-sec*-butyl phenyl methylcarbamate (BPMC) at a dilution of 8 times in water was performed. Male Wister rats were exposed in a chamber to the mixture for 1, 2, 4, or 6 hr. Concentrations of the chemicals in the chamber were measured, after spraying, to be 147 mg/m^3 for fenitrothion and 76 mg/m^3 for BPMC. Testing at 1 and 24 hr post-exposure indicated that plasma cholinesterase levels were greatly reduced, and erythrocyte ChE levels were somewhat reduced. Recovery of ChE activity was observed by day 7 after exposure. In field tests of the mixture, sprayed over 40 ha at 8 l/ha, air concentrations were measured immediately after spraying at 0.27-2.90 mg/m^3. No significant difference in the mean value of plasma and erythrocyte ChE levels in spray operators was noted when measured pre- and post-application. Plasma ChE levels were 79.1% before spraying and 78.6% after, and in erythrocytes, 90.5% and 92.6%, pre- and post-spray, respectively.

79-1179. Ogata, M.; Hasegawa, T.; Ueda, K. (Sch. Public Health, Fac. Med., Okayama Univ., Okayama, Japan) **[Ac-**

tion of paraquat dichloride and dimethyl dithiocarbamate on the mitochondria conversion system and superoxide-dismutase.] *Sangyo Igaku (Jpn. J. Ind. Health)* 20(6): 551-552; 1978. (Japanese)

The actions of paraquat and dimethyl dithiocarbamate (DMDTC) on oxidative phosphorylation in mitochondria and on the superoxide dismutase (SOD) in human and bovine erythrocytes were examined. Paraquat, as paraquat dichloride and Gramoxone, exhibited deconjugation of the energy conversion systems of the mitochondria. DMDTC almost completely inhibited the deconjugative action of copper ions in SOD. The ID50 of paraquat was 50 μmol on the mitochondria. As Gramoxone, the ID50 was 5.4 μmol on human SOD and 8.4 μmnol on bovine SOD. As paraquat dichloride, the ID50 values were 0.96 and 1.09 mmol, respectively. DMDTC had ID50 values of 0.6 and 0.96 mmol for human and bovine SOD, respectively. It was concluded that paraquat deconjugates the oxidative phosphorylation pathways in mitochondria and inhibits SOD in erythrocytes, but DMDTC only effects the activity of SOD.

79-1180. Simmer, V. F. (Author address not given) **Structural correlations of carcinogenic and mutagenic allyl halides.** In: *Structural Correlates of Carcinogenesis and Mutagenesis. Proc. Second FDA Office of Sci. Summer Symposium.* Asher, I. M., Zervos, C., eds. (FDA Office of Sci.: USA) pp. 163-171; 1977. (17 references)

Salmonella typhimurium, strains TA 1535 and TA 100, microbial assays were used to determine the mutagenic activities of a number of alkyl halides. For testing gases, agar overlay plates containing bacteria were placed in a 9 l dessicator, and then a known volumn of gas was introduced. For liquid testing, known volumes of chemicals were added to glass petri plates suspended beneath the shelves of the dessicators. Methyl bromide, methyl chloride, and methyl iodide were all mutagenic in strain TA 100. Among dihalomethanes, methylene bromide was most mutagenic. The approximate mutagenic activities were 1.3 TA 100 revertants/ppm at 400 μl for methylene chloride, 1400 revertants/ppm for bromochloro methane at 10 μl; and 3250 revertants/ppm at 0.3 μ l for methylene bromide. Bromoform, dibromo chloromethane, and bromodichloro methane were all mutagenic, but carbon tetrachloride or chloroform were not. Among carcinogenic alkyl halides, vinyl chloride, 1,1,2-trichloroethylene, bis(2-chloroethyl) ether, bis(2-chloro isopropyl) ether, 1- and 3-chloropropene, hexachlorobutadiene, and 3-bromopropionic acid were all mutagenic. The mutagenic activity of alkyl halides correlated well with their known chemical reactivities.

79-1181. Solomon, H. M.; Weis, J. S. (Rutgers Univ., Newark, NJ 07102) **Abnormal circulatory development in medaka caused by the insecticide carbaryl, malathion and parathion.** *Teratology* 19(1): 51-62; 1979. (29 references)

Three insecticides, carbaryl, malathion and parathion, were tested for teratogenic effects in developing medaka eggs. The concentrations of insecticides ranged from 0.5 to 40.0 ppm. The insecticides, dissolved in acetone, were added to dishes containing 10 newly fertilized eggs and 10 ml of embryo rearing solution. Circulatory anomalies noted included defects in heart morphology, pericardial edema, irregular heart beat, blood clots and oscillating blood in the heart. The ED50 (effective dose) for carbaryl was 2.5 ppm; malathion, 10.0 ppm; and parathion, 2.0 ppm. Limited exposure experiments were undertaken to determine possible sensitivity periods during development. These experiments, using 10 ppm carbaryl were initiated on days 0-7. Exposure lasted 24 to 96 hr. No periods of sensitivity were observed in these experiments. In a slightly varied experiment, eggs developed normally for 0-5 days, but were not removed from the insecticide once exposed. These results showed that carbaryl could cause circulatory abnormalities in 92% of the embryos which had completed cardiac morphogenesis before exposure. Combinations of malathion and carbaryl were administered to determine possible interactions. Twenty-five different combinations ranging from 0.0 to 25.0 ppm were employed. At low concentrations additive and antagonistic effects were observed. The above experiments show that these insecticides are teratogenic, that carbaryl at 10 ppm does not disrupt developmental events but rather affects cell physiology, and that combinations of some insecticides have an additive effect.

79-1182. Simon, N.; Siklosi, Cs.; Koszo, F. (Hautklin., Univ. Szeged, Szeged, Hungary) **Einfluss von Umweltfaktoren auf den Porphyrin stoffwechsel. [Effect of environmental factors on prophyrin metabolism.]** *Therapiewoche* 28(44): 8452, 8454, 8457-8458; 1978. (5 references) (German)

Hexachlorobenzene (HCB), hexachlorocyclohexane (BHC), pentachlorophenol (PCP), 2,4-D and endosulfan (ES) were added in 0.2% concentrations to the diets of rats. In all cases, high porphyrin excretions were established from 4 to 8 wk after onset of toxicosis. A substantial increase in ALA-excretion was observed only in the group treated with HCB. On the other hand, an increase in ALA-synthetase activity (determined during 10th wk of intoxication) was established in all groups, except for the HCB group. No direct connection was found between ALA-synthetase activity and the porphyrin excretion level in HCB tests. In another test, male rats, which had been previously made porphyritic with HCB, were simultaneously intoxicated with HCB and 2,4-D. On the 4th day of this combined toxicosis, 3 out of 5 animals showed an extremely high ALA-level with porphorobilinogen excretion. In a final test, rats were poisoned for 10 wk with HCB, chlorophenol and other chlorobenzenes, so that 20% of the HCB addition to the diet was exchanged. These catabolites did not affect the porphyritic process, which had been induced by HCB alone, significantly, however, the range in time of the porphyrin excretion was considerably longer than in the pure HCB group.

79-1183. Roux, F.; Puiseux-Dao, S.; Treich, I.; Fournier, E. (Unite Rech. Toxicol. Exp., INSERM, U 26, Hop. Fernand Widal, Paris, France) **Effect of lindane on mouse perito-**

neal macrophages. *Toxicology* 11(3): 259-269; 1978. (22 references)

Mouse peritoneal macrophages were exposed to lindane in 20% serum-medium at 37°C for 24 hr. Depressed uridine uptake and incorporation were the most pronounced effects of lindane on the macrophages, which occurred at 0.1 m*M* concentrations. A decrease was also noted in the pinocytosis rate and in the level of lysosomal enzyme. The rate of ^{3}H-leucine incorporation did not change. Pincytosis was significantly inhibited at a later time which was associated with cytoplasm vacuolation. The high lindane doses required to produce some of these macrophage functional changes have no relation to its insecticidal properties, but do involve stereochemical specificity.

79-1184. Faff, J.; Bak, W. (Mil. Inst. Hyg. & Epidemiol., PL-01163 Warsaw, Poland) **Increase in sensitivity to obidoxime induced by fluostigmine in the rat.** *Toxicol. Appl. Pharmacol.* 46(2): 429-433; 1978. (13 references)

The acute toxicity of obidoxime and its effects on neuromuscular transmission were studied in rats previously treated with atropine and fluostigmine. A single injection of atropine and fluostigmine (2 mg/kg sc) was given and then obidoxime was administered after 3, 24, 48, or 72 hr. It was demonstrated that the LD50 of obidoxime required to give an equivalent block of twitch response in the rat phrenic nerve-diaphragm preparation was markedly lower in rats pretreated with fluostigmine and atropine than in control animals. The greatest increase in sensitivity to obidoxime was seen 48 hr following fluostigmine administration. (Author abstract by permission)

79-1185. Aitio, A.; Parkki, M. G.; Marniemi, J. (Dep. Physiol., Univ. Turku, SF-20520 Turku 52, Finland) **Different effect of 2,3,7,8-tetrachlorodibenzo-*p*-dioxin on glucuronide conjugation of various aglycones. Studies in Wistar and Gunn rats.** *Toxicol. Appl. Pharmacol.* 47(1): 55-60; 1979. (24 references)

2,3,7,8-Tetrachlorodibenzo-*p*-dioxin (TCDD) (20 μg/kg) was administered to homozygous Gunn and Wistar as well as heterozygous rats and the activity of UDP-glucuronosyltransferase determined in the liver and kidney toward *o*-aminophenol, *p*-nitrophenol, 4-methylumbelliferone, and bilirubin. Diethylnitrosamine was used to activate the enzyme *in vitro*. TCDD did not enhance UDP-glucuronosyltransferase (UDPGT) activity ir the Gunn rat, either in the liver or in the kidney. In the Wistar rat, the UDPGT activity toward methylumbelliferone was enhanced eightfold in the liver and twofold in the kidney. TCDD did not affect UDPGT activity toward bilirubin. Diethylnitrosamine activated *o*-aminophenol and *p*-nitrophenol glucuronidation *in vitro* in the liver only. No activation in vitro due to diethylnitrosamine treatment could be seen in the liver of the TCDD-treated Wistar rat. (Author abstract by permission)

79-1186. Villeneuve, D. C.; Ritter, L.; Felsky, G.; Norstrom, R. J.; Marino, I. A.; Valli, V. E.; Chu, I.; Becking, G. C. (Environ. Toxicol. Div.) **Short-term toxicity of photomirex in the rat.** *Toxicol. Appl. Pharmacol.* 47(1): 105-114; 1979. (15 references)

When photomirex (8-monohydromirex) was fed to rats at dietary levels of 0, 0.5, 5.0, 50, or 500 ppm, all 10 animals receiving the highest dose level died within 7 days, and two of 10 animals in the 50-ppm group died after 24 days. All other animals (10 per group) survived until the experiment was terminated at 28 days. Animals receiving 50 ppm showed decreased body weight gain and food consumption. Liver hypertrophy and increased microsomal enzyme activity (aniline hydroxylase) were observed in groups of animals receiving 5.0 ppm and greater. Serum sorbitol dehydrogenase activity was increased in animals receiving 5.0 ppm and greater. photomirex accumulated in all tissues examined, with fat and liver having the highest residues. Histological alterations were observed in the liver of 0.5 ppm and consisted of mild midzonal cytoplasmic enlargement. At a level of 5 ppm, the midzonal cytoplasmic enlargement was more pronounced and was accompanied by mild anisokaryosis and nuclear hyperchromicity. At the highest dose, these alterations were accompanied by perivenous fatty infiltration. Lesions of the thyroid were observed in the group of animals receiving 50 ppm (6.61 mg/kg/day) and consisted of a generalized reduction in follicle size and colloid density. Animals which died showed pronounced thyroid follicular atrophy accompanied by severe colloid depletion and epithelial exfoliation. Animals receiving 50 ppm also had lesions in the testes consisting of a mild to marked reduction in spermatogenia and complete cessation of spermatogenesis. (Author abstract by permission)

79-1187. Nicholas, A. H.; Vienne, M.; Van Den Berghe, H. (Div. Hum. Genet., Dep. Human Biol., Univ. Leuven, B-3000 Leuven, Belgium) **Sister chromatid exchange frequencies in cultured human cells exposed to an organophosphorus insecticide: dichlorvos.** *Toxicol. Lett.* 2(5): 271-275; 1978. (15 references)

Whole blood cultures were exposed to DVP (dichlorvos) in concentrations of 2.5, 5.0 or 10 μg/ml. The number of metaphase cells was highly variable at DDVP concentrations greater than 10 μg/ml if the cels were exposed for periods of longer than 1 hr. With increasing concentrations of DDVP, decreases occurred in the number of lymphocytes and increases were noted in fetal fibroblasts. The differences, however, were insufficient to be of biological significance. The possibility that higher concentrations of DDVP might induce a further sister chromatid exchange frequency increase in the fetal fibroblasts was not able to be excluded from this study.

79-1188. Olorunsogo, O. O.; Bababunmi, E. A.; Bassir, O. (Biochem. Dep., Univ. Ibadan, Ibadan, Nigeria) **Toxicity of *N*-(phosphonomethyl) glycine to chick embryo.** *Toxicol. Lett.* 2(6): 319-321; 1978. (13 references)

Ten day old fertile eggs from White Rock and White Leghorn hens were injected with 1.5, 7.5, 15.0, 22.5, and 30

mg of *N*-(phosphonomethyl) glycine (PMG)/100 g egg at the yolk sac or 1, 5, 10, 15, and 20 mg/100 g at the air sac. Median lethal values of 12.88 and 13.12 mg PMG/100 g egg were obtained when PMG was injected into the air sacs of White Rock and White Leghorn eggs, respectively. These were significantly lower than the respective values of 24.72 and 25.44 mg PGM/100 g egg obtained by injection into the yolk sacs.

79-1189. Deskin, R.; Rosenstein, L.; Rogers, N.; Westbrook, B. (Health Effects Res. Lab., US EPA, Research Triangle Park, NC) **Parathion toxicity in perinatal rats exposed in utero.** *Toxicol. Lett.* 3(1): 11-14; 1979. (10 references)

Adult pregnant Charles River CD female rats were administered 0.01, 0.10, and 1.0 mg/kg/day parathion via oral gavage from the second day of gestation through day 15 of lactation. On day 24 after parturition, 10 offsprings from each group were examined for possible toxic effects. RBC (true ChE) and plasma (pseudo ChE) cholinesterase levels and heart activity were measured. Female perinates exhibited a significant reduction ($p \leq 0.05$) in plasma cholinesterase activity. True ChE activities in males and females were not significantly affected. Heart, arterial depolarization (P-R interval), ventricular polarization (QRS complex), and ventricular depolarization (P-R interval) rates were significantly decreased ($p \leq 0.05$) at the 1.0 mg/kg dose level. Male perinates showed a reduction in plasma renin activity ($p \leq 0.05$) at the 0.10 and 1.0 mg/kg levels; female plasma renin was affected at all parathion dose levels.

79-1190. Reuber, M. D. (NCI Frederick Cancer Res. Cent., Frederick, MD) **Carcinomas of the liver in Osborne-Mendel rats ingesting DDT.** *Tumori* 64(6): 571-577; 1978. (37 references)

Groups of 12 male and female rats were fed 0, 200, 600, or 800 ppm DDT (composed of 81.8% *p,p*-isomer, and 18.2% *o,p*-isomer) for up to 2 yr. Rats ingesting 400-800 ppm DDT developed tremors (which were more severe in females), decreased weight gains, and increased mortality in females. The livers of 200+ and 400+ ppm DDT treated male and female rats, respectively, significantly increased in size. These increases were caused by pericentral or diffuse hyperplasia. Centrilobular hepatic cell necrosis was also frequently seen. Neoplasms of liver were observed in 54% of the DDT-treated males and 36% of the females. Hepatocellular carcinomas varied from well-differentiated to undifferentiated. Neoplasms in the organs included lymphosarcomas in 28% of the males, and 92% ovary carcinomas in dosed females.

79-1191. Rotenberg, Iu. S.; Mazaev, V. T.; Shlepnina, T. G. (Toxicol. Lab., Munic. Sanit. Epidemiol. Stn., Moscow, USSR) **Osobennosti deistviia olovoalkilov na dykhanie i okislitel'noe fosforilirovanie mitokhondrii pencheni krys. [Characteristic features of the effect of tin alkyls on the respiration and oxidative phosphorylation in rat liver mitochondria.]** *Ukr. Biokhim. Zh.* 50(6): 695-700; 1978. (24 references) (Russian)

The effect of a series of tin di-, tri-, and tetraalkyls on the electron transfer and oxidative phosphorylation was studied in mitochondria isolated from the liver of random-bred albino rats. Toxicity of the tested compounds was determined after intragastric administration. The LD50 ranged from 9.5 mg/kg for tin tetraethyl, to 125 mg/kg for tin tetrabutyl, 200 mg/kg for tin tributylchloride, 160 mg/kg for tin tributylmetacrylate, 225 mg/kg for tin bis-tributyl oxide, 145 mg/kg for tin dibutyl sulfide, 330 mg/kg for tin diethyl dicaprilate, and 350 mg/kg for tin dibutyl di-isooctylthioglycolate. Toxicity of all tin alkyls except tin tetraethyl and tin bis-tributyl oxide, was correlated with their inhibitory activity *in vitro*.

79-1192. Kuz'minskaia, U. A.; Veremenko, L. M. (All-Union Res. Inst. Hyg. & Toxicol., Pestic., Polymers, & Plastics, Kiev, USSR) **Suktsinatdegidrogenaznaya i tsitokhromoksidaznaya aktivnosti v tkani pecheni krys pri deistvii Valeksona. [Effect of Valexon on succinate dehydrogenase and cytochrome oxidase activities in rat liver].** *Ukr. Biokhim. Zh.* 50(6): 711-713; 1978. (7 references) (Russian)

The effect of the organophosphorus pesticide Valexon (phoxim) on the activity of liver succinate dehydrogenase (SDH) and cytochrome oxidase (CO) was studied in random-bred albino rats. Animals received a single po administration of Valexon at 0.5 LD50 (310 mg/kg) and 1 hr, 1 day and 5 days later were sacrificed. In chronic experiments, rats received Valexon at 31 mg/kg/day for 1, 3 and 6 mo. Single administration of Valexon decreased CO activity in liver homogenate 1 hr after administration (5.3 IU, compared with 7.61 IU in controls), while the decrease in SDH activity was detected only on day 1 after administration (2.9 IU, compared with 7.55 IU in controls). In the supernatant, activities of CO and SDH showed increase only on day 5 after administration (0.62 IU and 0.45 IU, respectively, compared with 0.42 IU and 0.086 IU in controls). Chronic exposure to Valexon did not change CO activity in the liver homogenate, but resulted in an increase in CO activity in the supernatant (after 3 mo exposure CO activity was 0.80 IU, compared with 0.42 IU in controls). Activity of SDH in the homogenate increased after 1 mo exposure (8.49 IU, compared with 7.55 IU in controls), while activity of SDH in the supernatant was increased only after 3 and 6 mo of administration (0.35 IU and 0.59 IU, respectively, compared with 0.09 IU in controls).

79-1193. Iakushko, V. E. (All-Union Res. Inst. Hyg. & Toxicol., Pestic., Polymers, & Plastics, Kiev, USSR) **NADPH-Zsvisimoe okislenie v endoplasmaticheskom retikulume pencheni krys pri vvedenii valeksona. [Effect of Valexon on NADPH-dependent oxidation in endoplasmic reticulum of rat liver.]** *Ukr. Biokhim. Zh.* 50(6): 727-729; 1978. (11 references) (Russian)

The effect of organophosphorus pesticide Valexon (phoxim) on the NADPH-dependent oxidation in the liver

endoplasmic reticulum was studied in random-bred albino rats. Valexon was given po for 3 days, at 124 mg/kg/day (LD50 is 620 mg/kg). On day 1, 5 and 15 after the last administration, animals were sacrificed, and activity of liver demethylase (DM), hydroxylase (HL), uridine diphosphate glucoronyl transferase (UDPGT) and the level of ascorbic acid excretion were assessed. Valexon administration was found to stimulate the process of demethylation: DM activity started to increase on day 5 after administration and remained increased on day 15 (0.957 IU and 0.842 IU, respectively, compared with 0.602 IU in controls). Activity of HL showed decrease on day 1 (0.714 IU, compared with 0.304 IU in controls) followed by mild increase on day 5 (0.380 IU) and normalization on day 15. Activity of UDPGT was significantly increased only on day 1 after administration (5.48 IU, compared with 3.28 IU in controls). The level of urinary excretion of ascrobic acid showed progressive increase up to 538 μg/ml on day 1, 194.8 μg/ml on day 5 and 174.8 μg/ml on day 15 (compared with 118.5 μg/ml in controls).

79-1194. Trifonova, T. K. (Ukr. Sci. Res. Inst. Exp. Vet. Med., Kiev, USSR) **Rol' Yadokhimikatov v besplodii zhivotnykh [Role of pesticides in animal sterility.]** *Veterinariya (Moscow)* 4(8): 73-75; 1978. (8 references) (Russian)

The effect of toxic chemicals on fertility, the structure of the fetus, the possibility and degree of placenta permiability, and the isolation of the pesticides within milk were studied on albino rats. Gama-isomer of hexachlorocyclohexane (lindane), carbaryl, dicresyl and other toxins were used in the experiment. The compounds (0.02-0.04 LD50) were given to the animals with their food 2-3 mo before insemination. The females were killed 19-20 days after impregnation and their reproductive organs and fetuses removed. The time of pairing, the number of impregnated and pregnant animals, and the relationship between the yellow bodies in the ovaries and the fetuses in the uterus of the experimental and control animals were observed. Lindane and carbaryl had a negative effect on animal sterility, with 33 to 50% fewer pregnancies than in the control group, and with an embryo death rate of up to 60% of all pregnancies. Although the embryotoxic effect of the pesticides was greater during the first half of pregnancy, there was a destruction of embryos and fetuses through the pregnancy period.

79-1195. Ryasnyanskii, I. V. (Uzbek Vet. Res. Inst., Tashkent, USSR) **Snachenie sery i fosfora pri otravlenii ovets bazudinom. [Role of sulfur and phosphorus in poisoning of sheep with diazinon.]** *Veterinariya (Moscow)* 4(11): 96-98; 1978. (Russian)

The effect of subacute and chronic exposure to the organophosphorus insecticide Bazudin (diazinon) on the metabolic activity of sheep RBCs was evaluated. Single administration of diazinon at 225 mg/kg caused marked but temporary symptoms of poisoning. Incubation of the erythrocytes with ^{35}S-methionine, ^{35}S-sodium sulfate, and ^{32}P-sodium phosphate, showed diazinon poisoning caused marked changes in the ability of RBCs to incorporate radioisotopes: maximum incorporation of labeled methionine was detected on day 3 after exposure (0.96% vs 0.43% in controls) and maximal incorporation of ^{32}P was observed on day 7 after exposure (1.82% vs 0.66% in controls). Prolonged exposure of the sheep to small doses of insecticide (4, 6, 8 and 12 mg/kg of the combifodder, for 3 mo) resulted in the initial increase in the ability of RBC to incorporate sulfur and phosphorous followed by the decrease and repeated increase. The changes in the metabolic activity of RBCs depended upon the dose of insecticide administered.

79-1196. Viter, V. F. (Toxicol. Lab., Kiev Sci. Res. Inst., Kiev, USSR) **Sostoianie reguliatornykh sistem organizma pri razlichnykh rezhimakh vozdeistiia sevina. [Condition of regulatory systems of the body under various schedules of carbaryl exposure.]** *Vrach. Delo* (9): 113-117; 1978. (13 references) (Russian)

The condition of the body regulatory systems exposed to carbaryl and ways to prevent its continuous adverse effects were studied. There were two experimental schedules: continuous (7 days) and intermittent (7 days of priming, 7 days of interval), with the carbaryl concentration at 55.0 ± 5.1 and 120.0 ± 15.0 mg/m^3, respectively. The activity of cholinesterase (CS) in the brain and blood serum, the level of adrenaline (A) and norepinephrine (NP), and the condition of the central nervous system served as indices for the toxic effect of the compound on the central regulatory systems. The 6 wk experiment was conducted daily (4 hr) on 140 rats. There was a considerable drop in the level of CS activity in both groups, and an intensified biotransformation (NP into A) in the first group, and an increase of A and NP in the second. The second schedule of carbaryl application had more dangerous effects on some regulatory mechanisms than the first dose schedule.

79-1197. Glukhova, L. G.; Vasilenko, T. E.; Apon, N. I. (Dep. Gen. Chem., Med. Inst., Vinnitsa, USSR) **Sravnitel'naia kharakteristika vliianiia khlor- i fosfororganicheskikh iadokhimikatov na zhelcheobrazovatel'nuiu funktsiiu pecheni. [Comparative effect of organochlorine and organophosphorus pesticides on cholepoietic function of the liver.]** *Vrach. Delo* (11): 130-131; 1978. (5 references) (Russian)

The effect of polychloropinene, Despirol (kelevan) and phosalone pesticides on the cholepoietic function of the liver was studied in random-bred albino rats. Animals received single ig doses of pesticides at 0.5 LD50 (175 mg/kg for polychloropinene, 140 mg/kg for Despirol, and 67.5 mg/kg for phosalone). The rate of bile secretion was assessed on day 1, 3 and 5 after exposure. Exposure to the pesticides resulted in a marked decrease in the rate of bile secretion from 5.0 mg/min/100 g in control rats to 3.7 on day 1 after Despirol administration, and 4.3 mg/min/100 g on day 1 after phosalone administration (exposure to polychloropinene decreased the rate of bile secretion on day 3-5 after exposure). Due to a decrease in the rate of bile secretion in treated rats, the overall amount of bile production in these animals was lowered.

79-1198. Roese, I.; Hundsdoerfer, S. (Kinderabt., Inst. Pathol. Med., Akad. Magdeburg, Magdeburg, DDR) **Paraquat-Schaedigung der Lunge - ein Tiermodell zum Atemnotsyndrom. [Paraquat damage to the lung - an animal model for the asthma syndrome.]** *Z. Erkr. Atmungsorgane* 151(2): 176-177; 1978. (German)

Lung tissue of adult guinea pigs subcutaneously injected with a 2% paraquat solution in 2 dosages (20 and 35 mg/kg) was examined for 9 enzymes (LDA, [sic] α-GPDH, G-6-PDH, SDH, β-HBDH, alkali and acid phosphatase, and 2 unspecific esterases). Only 20% of the animals killed after 12 hr and typical hyaline lung membranes, the others showed ventilation disturbances, edema, and intraalveolar bleedings. Necrosis and detached pneumocytes II were confirmed in semi-thin-section. Of those animals killed 36-48 hr after injection, 80% showed hyaline lung membranes with inclusion of necrotic pneumocytes and so-called hematoxylin particles, and in the semi-thin-section findings typical for RDS. Morphologically, the paraquat-induced syndrome also corresponded to the disease pattern found in human newborns.

79-1199. Malmqvist, E.; Robertson, B. (Dep. Clin. Chem., Karolinska Inst., Stockholm, Sweden) **Biochemische veraenderungen des surfactant-systems der lunge nach Paraquat-vergiftung. [Biochemical changes of the pulmonary surfactant system after paraquat poisoning.]** *Z. Erkr. Atmungsorgane* 151(2): 177-178; 1978. (German)

In laboratory animals subcutaneously injected with 35 mg paraquat/kg, the lecithin level in the lungs and in the alveolar wash decreased significantly within 24 hr of injection. Since these structural and functional changes are very similar to the typical changes accompanying the idiopathic asthma syndrome, paraquat poisoning has been suggested as the experimental model for that disease.

79-1200. Lofroth, G. (Wallenberg Lab., Univ. Stockholm, Stockholm, Sweden) **The mutagenicity of dichloroacetaldehyde.** *Z. Naturforsh. Teil C* 33: 783-785; 1978. (20 references)

The Salmonella/microsome test was conducted and showed dichloro acetaldehyde to be mutagenic. The chemical caused a reversion frequency of 58 revertants/μmol, about one tenth of the mutagenicity of chloroacetaldehyde. The mutagenicity of each chemical decreased in the presence of the microsomal activation system. Part of the decrease was dependent on the presence of the co-factors NADP and glucose-6- phosphate. Dichlorvos showed a mutagenicity corresponding to 17 revertants/μmol and was independent of the microsomal activation system over a wide range of S-9 additions. It is stressed that an evaluation of the mutagenic effects of a particular chemical must include an evaluation of the mutagenic effects of the metabolites of that chemical.

79-1201. Pudelko, Z. (Agric. Acad., Warsaw, Poland) **Uboczne skutki stosowania insektycydow do zwalczania stonki ziemniaczanej na mikoflorze korzeni ziemniaka. [Side-effects of application of insecticides (Tritox and enolophos) on the mycoflora of potato roots].** *Zesz. Probl. Postepow Nauk Roln.* 198: 161-170; 1978. (20 references) (Polish)

The effect of Tritox (a mixture of DDT, BHC, and methoxychlor) and enolophos on the mycoflora of potato roots is discussed. Potatoes (lenino variety) were cultivated within a crop rotation and in monoculture systems. In 1972, the potatoes were treated with Tritox, and in 1973 with enolophos. Potatoes cultivated in the same way but without insecticide treatment were used as controls. The isolation of fungi form roots was performed on the acidified glucose-potato nutrient medium. Samples for analysis were chosen stochastically. Both Tritox and enolophos caused a reduction in the amount of fungi of the genus *Colletotrichum* and stimulated the growth of *Penicillium* fungi, while enolophos acted in a reverse manner by stimulating *Colletotrichum* and inhibiting *Penicillium*.

See also **79-1014**, **79-1015**, **79-1017**, **79-1027**, **79-1040**, **79-1083** *and* **79-1248**.

79-1202. Blunden, S. J.; Chapman, A. H. (Int. Tin. Res. Inst., Greenford, Middlesex UB6 7AQ, England) **Fluorimetric determination of triphenyltin compounds in water.** *Analyst (London)* 103(1233): 1266-1269; 1978. (10 references)

Samples of distilled water, tap water, canal water, and synthetic sea water were spiked with standard solutions of triphenyltin chloride in ethanol. The triphenyltin compounds in the water at concentrations of 0.004 to 2 ppm were readily extracted into toluene and were determined spectro fluorimetrically by measuring the triphenyltin- 3-hydroxyflavone complex.

79-1203. Wells, D. E. (Freshwater Fish. Lab., Pitlochry, England) **The isolation and identification of polychloro-2-(chloro- methyl sulphonamide) diphenyl ether isomers and their metabolites from Eulan WA New and fish tissue by gas chromatography mass spectrometry.** *Anal. Chim. Acta* 104(2): 253-266; 1979. (5 references)

The active ingredients of Eulan WA New have been isolated and identified by nuclear magnetic resonance and mass spectrometry. The gas chromatography thermal decomposition products of the polychloro-2- (chloromethyl sulphonamide) diphenyl ether isomers have been monitored and the chromatogram of Eulan WA New has been characterized. A method for the extraction, clean-up, and analysis of the isomers and their metabolites in fish tissue by GC-MS has been developed. (Author abstract by permission)

79-1204. Holt, R. F.; Leitch, R. E. (Biochem. Dep., E. I. duPont de Nemours & Co. Inc., Wilmington, DE) **Oxamyl.** In: *Analytical Methods for Pesticides and Plant Growth Regulators.* Zweig, G., Sherma, J., eds. (Academic Press: NY) 10(Chapter 12): 111-118; 1978. (4 references)

The recommended methods for formulation and residue analysis of oxamyl are given. Formulations of oxamyl can be assayed by liquid chromatography using ultraviolet absorption detection (254 nm). The recommended sample size is 3 μl and the retention time is approximately 14 min. Soil residues of oxamyl can be detected after extraction by ethyl acetate and isolation by evaporation. Milk and other liquid residues can be extracted with hexane. Determination of the amount of residue present is done by gas chromatography which is sensitive to residue levels as low as 0.5 μg. A detection limit of 0.02 ppm in 25 g is normally noted, however acidic samples yielded somewhat lower recoveries.

79-1205. van Rossum, A.; de Wilde, P. C.; de Boer, F. G.; Korver, P. K. (Philips-Duphar Res. Lab., Weesp, The Netherlands) **Tetradifon.** In: *Analytical Methods for Pesticides and Plant Growth Regulators.* Zweig, G., Sherma, J., eds. (Academic Press: NY) 10(Chapter 13): 119-126; 1978. (6 references)

The recommended method for tetradifon formulation analysis is gas chromatography. A glass column packed with 3% SE-52 on Chromosorb W HP is used. The injection volume is 10 μl. The relative retention time with respect to hexacosane is 0.86. The absolute retention time is approximately 10 min. Residues to be analyzed for tetradifon can be extracted by a mixture of acetonitrile and water. Determination is done by means of GLC on a glass column packed with Chromasorb W HP, Gas chrom Q, or Anakrom ABS. Recovery ranges are from 85 to 107%. An alternative method with recovery ranges for 85 to 100% is also outlined.

79-1206. Thier, W. G.; Hommel, K.; Hoppe, T. (Hoechst AG, Frankfurt, BRD) **Triazophos.** In: *Analytical Methods for Pesticides and Plant Growth Regulators.* Zweig, G., Sherma, J., eds. (Academic Press: NY) 10(Chapter 14): 127-137; 1978. (6 references)

Three methods of triazophos formulation analysis are discussed. The recommended method is separation by thin layer chromatography (TLC). Silica gel HF254 is used and the plates are developed in benzene: acetone 9:1 (v/v). A UV detector is used. Residual amounts of triazophos can be determined by gas chromatography with flame photometric detector with either Nuchar-Attaclay or gel permeation clean-up step. The detection limit for triazophos in biological material is approximately 0.01-0.02 mg/kg and recoveries were in the range of 75-100%.

79-1207. Anonymous **Vendex miticide.** In: *Analytical Methods for Pesticides and Plant Growth Regulators.* Zweig, G., Sherma, J., eds. (Academic Press: NY) 10(Chapter 15): 139-153; 1978.

The organotin miticide, Vendex (fenbutatin-oxide), can be determined in biological samples by gas chromatography using an electron capture detector. Extraction of the pesticide is achieved with dichloromethane and which is either decanted for liquid samples or filtered for soil or organic samples. Vendex has a standard retention time of 2-3 min on a glass column (1.8 x 3 mm) packed with Chromosorb W, or Chromosorb HP. The recovery range is between 85 and 96%. The minimum detectable concentration is 0.02 mg/kg.

79-1208. Bleidner, W. E.; Morales, R.; Holt, R. F. (E. I. duPont de Nemours & Co. Inc., Wilmington, DE) **Benomyl.** In: *Analytical Methods for Pesticides and Plant Growth Regulators.* Zweig, G., Sherma, J., eds. (Academic Press: NY) 10(Chapter 16): 157-171; 1978. (13 references)

Residues of benomyl is soils and plant tissues can be determined by high performance liquid chromatography (HPLC). Benomyl formulations are measured by the infrared absorbance at 8.74 μm (1127/cm) with 8.56 μm and 8.87 μm as references. The 8.74 μm band is specific for benomyl when MBC, a conversion product, is present. Residual analysis is performed by HPLC. Soil samples are extracted with acidic methanol, causing conversion of benomyl to MBC. Benomyl and MBC residues are then measured. Residues of any 2-AB (2-amino benzimidazole) can be measured simultaneously but separately. Recoveries of benomyl, MBC, and 2-AB averaged 92, 88, and 71%, respectively. The lower detection limit is 0.05 ppm for each of the compounds.

79-1209. Carlstrom, A. A.; Leary, J. B. (Chevron Chem. Co., Richmond, CA) **Captafol.** In: *Analytical Methods for Pesticides and Plant Growth Regulators.* Zweig, G., Sherma, J. eds. (Academic Press: NY) 10(Chapter 17): 173-180; 1978. (3 references)

The recommended method for formulation analysis of captafol is to extract the chemical from inert material with a solution containing di- *n*-butyl phthalate in dichloromethane. The solution is chromatographed on a microparticulate silica gel column, using dichloromethane as the mobile phase. The ultraviolet response is used to calculate the ratio of the captafol peak height to the di- *n*-butyl phthalate peak height. This ratio is compared to the standard material. Technical captafol as well as flowable formulations, wettable powders, and various formulations containing other active ingredients can be analyzed by this method. An alternate gas chromatographic procedure is described. The recommended method for residue analysis calls for extraction of captafol from the sample with ethyl acetate. After clean-up the captafol is measured by gas chromatography using either a flame photometric detector or electron capture detector. The limit of detection of the method ranges from 0.01 ppm using the electron capture detector to 0.03 ppm using the flame photometric detector.

79-1210. Amadori, E.; Heupt, W. (E. Merck, Dermstadt, BRD) **Dithianon.** In: *Analytical Methods for Pesticides and Plant Growth Regulators.* Zweig, G., Sherma, J., eds. (Academic Press: NY) 10(Chapter 18): 181-187; 1978. (6 references)

Dithianon is a protective and nonphytotoxic fungicide with a broad spectrum of activity for controlling diseases of pome and stone fruit, small fruit, citrus, coffee, and ornamentals in the field of wine-growing. The acute oral median lethal dose for rats is 638 mg/kg, for guinea pigs, 110 mg/kg, and for dogs 100 mg/kg. The recommended method for analysis of technical formulations calls for reaction of the sample with sodium borate to give a chromophore, the absorption of which is measured at 365 nm. The recommended method for residue analysis calls for extraction of dithianon from the sample with acetone with the addition of concentrated mineral acid and then extraction into chloroform. Further purification is achieved by column chromatography with Florisil. When strongly colored eluates are involved, additional column chromatography with polyamide is carried out.

79-1211. Van Auken, O. W.; Hulse, M. (Div. Allied Health & Life Sci., Univ. Texas, San Antonio, TX) **Hexachlorophene.** In: *Analytical Methods for Pesticides and Plant Growth Regulators.* Zweig, G., Sherma, J. Eds. (Academic Press: NY) 10(Chapter 19): 189-214; 1978. (66 references)

Hexachlorophene action seems to involve interaction of the parent molecule with lipid or protein components of the membrane system. The activity of certain enzymes is altered resulting in the inhibition of cell function and finally bactericidal or fungicidal activity. A single oral dose of 250 mg/kg is fatal for children, and daily doses of 20 mg/kg for three consecutive days causes toxic symptoms. A single oral dose of 300 mg/kg is fatal to adults. While HCP may be absorbed directly through the skin, the rate of uptake is drastically increased if a lesion is present. Presently hexachlorophene is registered for field use in the US. Isobac, one of the formulations, is used on cotton for control of seeding disease and boll rot. Hexide, another formulation is used as a bactericide or fungicide on tomatoes, peppers and cucumbers. The recommended method for formulation analyses is gas chromatography with an electron capture detector. The recommended method for residue analysis involves a modified gas chromatographic procedure using plant tissue. A repetitive organic solvent extraction removes HCP from the homogenized tissue. Two separate procedures are used to clean up the samples. The residue extract from tissues low in lipids is derivatized, and liquid-solid absorption column chromatography is used for cleanup. For tissues high in lipids, a two-stage column is used, one prior to derivatization and the other after. Quantification of the residue is by gas-liquid chromatography with high-temperature electron capture detection.

79-1212. Nakamura, T.; Yamaoka, K.; Kotakemori, M. (Agric. Chem. Res. Lab., Sankyo Co. Ltd., Shiga-ken, Japan) **Hymexazol.** In: *Analytical Methods for Pesticides and Plant Growth Regulators.* Zweig, G., Sherma, J. Eds. (Academic Press: NY) 10(Chapter 20): 215-228; 1978. (7 references)

Hymexazol, a soil fungicide, is effective against soil-borne diseases caused by *Fusarium, Aphanomyces, Pythium,* and *Corticium* spp. The chemical is also effective as a plant growth promoter for rice seedlings, especially for the promotion of root growth. Mammalian toxicity is very low. The recommended method for formulation analysis calls for a gas chromatographic determination of hymexazol carried out by an internal standard procedure. Hymexazol in liquid formulation is extracted with ethyl acetate after acidification with hydrochloric acid. Dust and wettable powder are extracted with acetone. The recommended method for residue analysis calls for extraction with acetone and then transfer into aqueous sodium bacarbonate solution. Co-extracted interfering substances are removed by washing the sodium bicarbonate solution with diethyl ether. Hymexazol is then extracted from the aqueous solution after acidification and subsequently reacted with DECTP. The derivative thus formed is determined by gas chromatography with a flame thermionic detector or a flame photometric detector after further clean-up with Florisil column chromatography.

79-1213. Hattori, T.; Kanauchi, M. (Japan Agric. Chem. Co. Ltd., Osaka Japan) **Isoprothiolane.** In: *Analytical Methods for Pesticides and Plant Growth Regulators.* Zweig, G., Sherma, J. eds. (Academic Press: NY) 10(Chapter 21): 229-236; 1978.

Isoprothiolane is a systemic fungicide controlling rice blast. It is effective in both spray application of dust, emulsifiable concentrate, or wettable powder and granular application in submerged paddy fields. The chemical also has some

insecticidal activity. The recommended method for formulation analysis calls for separation of isoprothiolane by gas chromatography and measurement by flame ionization detection using diethylhexyl adipate as internal standard. The recommended method for residue analysis calls for extraction from samples with benzene-acetone. Cleanup is achieved by liquid partitioning from acetonitrile into hexane followed by chromatography on a Florisil column. Isoprothiolane residues are measured by gas chromatography using an electron capture detector. The sensitivity of the method is 0.002 ppm based on a 50 g sample.

79-1214. Asshauer, J.; Hommel, K.; Hoppe, T. (Hoechst AG, Frankfurt, Germany) **Pyrazophos.** In: *Analytical Methods for Pesticides and Plant Growth Regulators.* Zweig, G., Sherma, J., eds., (Academic Press: NY) 10(Chapter 22): 237-241; 1978. (4 references)

Pyrazophos is a slightly systemic fungicide, controlling powdery mildews on a wide range of crops at rates of 0.01 to 0.03% ai and on cereals at 0.5 to 0.7 kg ai/ha. The chemical has only a limited insecticidal and acaricidal activity. The uptake by roots is insufficient when used as a soil or a seed dressing. The recommended method for formulation analysis calls for dissolving the formulated material in chloroform and separation bv thin-laver chromatography. After the separated compound is eluted from the TLC plate, the sulfur in the compound is oxidized to sulfuric acid. The sulfuric acid is titrated with barium perchlorate and forms the basis for calculating active material. The recommended method for residue analysis calls for extraction of pyrazophos from the homogenized sample by Soxhlet extraction with a chloroform-methanol mixture. Impurities and methanol are removed by shaking with an aqueous sodium chloride solution. After drying with sodium sulfate, the chloroform extract is concentrated by evaporation and the residue taken up in ethyl acetate. Pyrazophos is determined in this solution by gas chromatography with phosphorus-selective FPD detection.

79-1215. Darskus, R.; Eichler, D. (Celamerck GmbH & Co., Ingelheim, BRD) **Triforine.** In: *Analytical Methods for Pesticides and Plant Growth Regulators.* Zweig, G., Sherma, J. eds., (Academic Press: NY) 10(Chapter 23): 243-251; 1978. (6 references)

Triforine is used in the form of emulsifiable concentrates and as a liquid seed dressing formulation. The recommended method for formulation analysis calls for separation of triforine from formulation adjuvants by thin layer chromatography and determination on the thin layer plate by densitometry. The recommended method for residue analysis calls for blending of the sample with acetone. After removal of the acetone by distillation, the triforine in the remaining aqueous phase is partitioned into toluene which is then evaporated and the active substance degraded by heating with dilute sulfuric acid. Chloral hydrate is thus formed and subsequently distilled and determined by gas chromatography with an electron capture detector. The detection limit is about 0.005 to 0.01 ppm.

79-1216. Conkin, R. A. (Monsanto Co., Agric. Res. Dep., St. Louis, MO) **Alachlor.** In: *Analytical Methods for Pesticides and Plant Growth Regulators.* Zweig, G., Sherma, J. eds. (Academic Press: NY) 10(Chapter 24): 255-265; 1978. (1 reference)

Alachlor exhibits a high degree of preemergence inhibitory action toward various seeds and seedlings of certain weeds. There is a safety factor for various field crops, especially corn and soybeans. The recommended method for formulation analysis involves the use of gas chromatography whose advantages are speed, specificity, and relatively high precision and accuracy. The active ingredient content of an unknown sample is determined by analytical comparison with a standard alachlor of known purity. For residue analysis, the metabolism of alachlor into several conjugated-type products allows the detection and measurement of the 2,6-diethylaniline (DEA) moiety in sufficient amounts to provide a basis for an analytical procedure. Reocvery of DEA from crop extracts is achieved by refluxing in acid followed by steam distillation from a basic solution to recover the DEA. Further cleanup of the distillate results in a fraction suitable for flame ionization, gas chromatography detection and quantitation of the recovered DEA. A variety of raw agricultural commodities can be analyzed by this method, including soybeans, corn, cottonseed, peanuts, and their respective forages, as well as beans, peas, and potatoes.

79-1217. Yamane, F.; Tsuchiya, K. (Japan Agric. Chem. Co. Ltd., Osaka Japan) **Chlomethoxynil.** In: *Analytical Methods for Pesticides and Plant Growth Regulators.* Zweig, G., Sherma, J. eds, (Academic Press: NY) 10(Chapter 25): 267-273; 1978. (1 reference)

Chlomethoxynil is a selective herbicide that controls most annual grass weeds and many annual broadleaf weeds when applied in the paddy before the emergence of the weeds. The chemical moves very little in the soil. Microbial and photochemical decomposition occurs in the paddy resulting in a half-life of 2-7 wk. The recommended method for formulation analysis calls for gas chromatography using benzyl *n*-butylphthalate as an internal standard. An SE-52 column effectively separates chlomethoxynil and the standard from impurities and other components of the formulation. Detection is carried out by flame ionization. The recommended method for residue analysis calls for extraction from samples with acetone. After evaporation, the residue is dissolved in hexane and washed sequentially with sodium hydroxide solution, hydrochloric acid solution, and sodium sulfate solution. Cleanup is achieved by liquid partitioning followed by column chromatography. Residues of chlomethoxynil are determined by gas chromatography using an electron capture detector. The method is sensitive to 0.001 ppm based on 20 g of the sample.

79-1218. Anal. Dep., Biol. Sci. Res. Cent., Shell Dev. Co., Modesto, CA **Cyanazine.** In: *Analytical Methods for Pesticides and Plant Growth Regulators.* Zweig, G., Sherma, J. eds. (Academic Press: NY) 10(Chapter 26): 275-292; 1978.

Cyanazine is the principal ingredient of the herbicide Bladex. The chemical has both preemergence and postemergence activity, acting primarily as a photosynthesis inhibitor. It controls over fifty annual grasses and broadleaf weeds and is labeled for use in corn, soybeans, and cotton. It has a relatively short persistence in soil. The recommended method of analysis calls for chloroform extracts to be prepared for the formulation suitable for liquid chromatographic analysis. Peak height is compared to that for a standard solution of cyanazine. Alternative methods for wettable powders and granules are offered. Residues of cyanazine in crops and soils can be determined by gas-liquid chromatography using either an alkali flame ionization detector or an electron capture detector.

79-1219. Mourille, M.; Bentejac, R.; Valade, J. (Inst. Pin, Univ. Bordeaux I, F-33405 Talence, France) **Determination of boron-containing pesticide residues in citrus fruits.** *Ann. Falsif. Expert. Chim.* 71(769): 361-367; 1978. (3 references) (French)

The authors of this study propose a method for the dosage of boron-derived pesticide residues in citrus fruits at mimimal concentrations (1 mg/kg). A description of the various steps leading to the establishment of a standard curve after treatment of 1-50 ml quantities of a standard boron solution (0.01 mg/ml) is given. The citrus samples, skin (10 g) or pulp (25 g), are crushed in a mixer with distilled water. Calcification of this mixture at 600°C in the presence of calcium hydroxide results in the destruction of organic matter. Quinalizarin in a 45 mg/l sulfuric acid solution serves as reagent. The boron content is determined by colorimetry of the quinalizarin-boric acid complex. The results obtained are indicated on the standard curve. For the purpose of verification, the results were checked by adding known boron quantities to aliquot samples, with duplicate testing. Lemons and oranges from various sources underwent the dosage with resulting boron contents of 1.5 to 21.3 mg/kg in the skin, 1.5 to 3.9 mg/kg in the pulp and 2.1 to 10.5 mg/kg for the whole fruit. The difference between two results on the same average sample was $\leq$ 0.5 mg/kg. The presence of boron was noted even in fruit which were postitively known to have remained untreated. This raises the problem of minimum tolerance.

79-1220. Kvalvag, J.; Iwata, Y.; Gunther, F. A. (Chem. Res. Lab., Agric. Univ. Norway, N-1432 An-NLH, Norway) **High-pressure liquid chromatographic separation of *o,p'*- and *p,p'*-dicofol and their dichlorobenzophenone degradation products.** *Bull. Environ. Contam. Toxicol.* 21(1-2): 25-28; 1979. (5 references)

Conditions for the separation of *o,p'*- and *p,p'*-dicofol and *o,p'*- and *p,p'*-dichloro benzophenone are presented. A Waters Associates liquid chromatograph with 0.5 m by 2.2 mm i.d. tube packed with Bondapak *R* C_{18}ODS on 37-50 μ m corasil silica was used. Detector settings were given, as were concentrations of pesticides and solvents. The use of 1.2% acetone reduced baseline drift. Separation was obtained even though the column was packed with coarse material; this precludes the reduced efficiency caused by extraneous materials injected into columns of finer sized materials.

79-1221. Holdrinet, M. (Pestic. Residue Test. Lab., Ontario Minist. Agric. & Food Univ. Guelph, Guelph, Ontario, Canada) **Confirmation of mirex and *cis*- and *trans*- chlordane in the presence of other organochlorine insecticides and polychlorinated biphenyls.** *Bull. Environ. Contam. Toxicol.* 21(1-2): 46-52; 1979. (12 references)

Studies were performed in which improved methods were developed to detect mirex and chlordane in the presence of other organochlorines and PCB. The principle variation in the standard technique is the addition of 5 ml of concentrated sulfuric: fuming nitric acid 1:1 (v/v) to a flask in which the cleaned up extraction has been evaporated to dryness. Details are presented for further extraction and concentration of samples. Results of GLC analysis show that nitration removes the PCB's and other interfering compounds. The method seems suitable for chlordane and mirex analysis only.

79-1222. Kveseth, N. J.; Brevik, E. M. (Dep. Pharmacol. & Toxicol., Vet. Coll. Norway, Oslo, Norway) **Column chromatographic method for cleaning up extracts from biological material and simultaneous separation of PCBs and DDE.** *Bull. Environ. Contam. Toxicol.* 21(1-2): 213-218; 1979. (7 references)

Gas chromatographic samples were cleaned up to separate PCB's from DDT using column chromatography. To quickly elute large samples, the standard fine grained silica gel was replaced by Woelm 0.063-0.2 mm or 0.05-0.2 mm. A combination column was described which simultaneously cleaned-up extracts of biological samples. Experiments were performed to determine the stability of the silica gels with various amounts of water. The gels were stable during prolonged storage (one month). The clean-up and separation of PCB's from DDE was rapid and required relatively small amounts of chemicals.

79-1223. Wheeler, W. B.; Thompson, N. P.; Edelstein, R. L.; Krause, R. J. (Pestic. Res. Lab., Food Sci. & Human Nutr. Dep., Univ. Florida, Gainesville, FL 32611) **Ultrasonic extraction of carbofuran residues from radishes.** *Bull. Environ. Contam. Toxicol.* 21(1-2): 238-242; 1979. (5 references)

Radishes were treated, by soil application, with ^{14}C-carbofuran at a rate of 0.09 kg/acre. Radishes harvested 3 days later were homogenized with a Model PT-10-35 Polytron homogenizer, using 100 portions in 200 ml acetone at various speeds and times. Slurries were filtered, then filtrate and extracts were analyzed by scintillation counter to determine the radioactivity in each. Blending times of 0.5 min or longer at maximum speed are good for efficient extraction. A shorter blending time (0.25 min) extracted only 52% of the pesticide, but the temperature of the solvent remained lower, eliminating the problems associated with elevated solvent temperatures.

79-1224. Muslimov, M. K.; Ikramov, L. T. (Pharmaceut. Inst., Tashkent, USSR) **Sravnitel'naia otsenka metodov izolirovaniia antio iz biologicheskogo materiala. [Comparative evaluation of methods of isolation of anthio from biological specimens.].** *Farmatsiya (Moscow)* 27(6): 28-31; 1978. (3 references) (Russian)

An attempt was made to develop a method for isolating organophosphorus insecticide Anthio (formothion) from cadaver specimens. The efficacy of five methods of isolation of Anthio from liver tissue was tested. It was found that Anthio can not be detected by steam distillation technique. Three methods of isolation with acidified water or alcohol yielded 16% isolation (Vasil'eva's method), 14% (Kramarenko's method) and 30% isolation (Otto-Stas' method). The best results were achieved after infusion of liver specimens with various organic solvents: 3x infusion with chloroform yielded 41% isolation of Anthio.

79-1225. Schulten, H. R. (Inst. Phys. Chem., Univ. Bonn, D-5300 Bonn, BRD) **Felddesorptions- Massenspektrometrie von Biociden des Phenylharnstoff-, Carbamat- und Thiocarbamattyps. [Field desorption mass spectrometry of biocides of the phenylurea and carbamate type.]** *Fresenius Z. Anal. Chem.* 293(4): 273-281; 1978. (22 references) (German)

Herbicides, insecticides and fungicides of the phenylurea, carbamate, and thiocarbamate type have been investigated by field desorption mass spectrometry. The spectra obtained show high molecular ion intensities and a characteristic framgentation pattern. In view of the identification of these biocides in environmental sample (e.g. from surface water) the limits of detection for standard compounds and test mixtures were evaluated. The optimal methodological parameters for trace analyses of these compounds in low and high resolution field desorption mass spectrometry are described. For electrical detection and accumulation of the spectra with a multichannel analyzer and the thus available registration of the isotopical distribution of the molecular ions yield an additional information which further improves the reliability of the identification of environmental chemicals. (Author abstract by permission)

79-1226. Schmeltz, I.; Chiong, K. G.; Hoffmann, D. (Naylor Dana Inst. Dis. Prev., Am. Health Found., Valhalla, NY 10595) **Formation and determination of ethyl carbamate in tobacco and tobacco smoke.** *J. Anal. Toxicol.* 2(6): 265-268; 1978. (3 references)

Maleic hydrazide (MH), a growth regulator used in tobacco growing, thermally degrades to isocyanic acid, which reacts with methanol and ethanol (both present in tobacco smoke) to form ethyl carbamate (urethan), a known carcinogen, and methyl carbamate. A method using two solvent partition steps, column chromatography and GM/MS are used to identify and quantify ethyl carbamate in tobacco smoke. Untreated and MH-treated tobacco contained similar amounts of ethyl carbamate, ranging from 20-38 ng/cigarette, and show no major differences in ethyl carbamate levels (310-375 ng/g). This method of analysis may be useful for identifying and quantifying ethyl carbamate levels in other agricultural products.

79-1227. Bailey, R.; LeBel, G.; Lawrence, J. F. (Pestic. Sect., Health Prot. Branch, Halifax, Novia Scotia, Canada) **Gas-liquid chromatography of triazine herbicides as heptafluorobutyryl derivatives and some applications to analysis in foods.** *J. Chromatogr.* 161(1): 251-257; 1978. (15 references)

The heptafluorobutyryl (HFB) derivatives of ten triazine herbicides were prepared by reacting the pesticides with heptafluorobutyric anhydride in benzene, in the presence of trimethylamine or pyridine as catalyst. The reactions produced mainly the mono-HFB products while some of the herbicides had small quantities of the di-HFB derivatives present. The derivatives were 300 fold to several thousand fold more sensitive to electron-capture detection than the underivatized triazines. They also were 5-10 fold more sensitive than the parents by electrolytic conductivity detection in the halogen mode while they were of similar sensitivity with the same detector in the nitrogen mode. The derivatives eluted in the same general order as the parent triazines on stationary phases of OV-1, OV-101, OV-101/QF-1, and OV-210. This method was successfully applied to the analysis of potatoes, peas and tomatoes spiked with various triazines at levels of 0.13-0.86 ppm. (Author abstract by permission)

79-1228. Pribyl, J.; Herzel, F. (Inst. Wasser, Boden & Lufthyg., Bundesgesundheitsamt., Berlin, BRD) **Fluessigchromatographische Parameter herbizider Wirkstoffgruppen. III. Harnstoffherbizide - Ergaenzung. [Liquid chromatographic parameters of herbicide groups. III. Urea herbicides - additional information.]** *J. Chromatogr.* 166(1): 272-278; 1978. (4 references) (German)

This additional note to a previously published article (1976) presents in a table the retention behavior and UV-absorption of chlorobromuron, linuron, metobromuron, monolinuron, diflubenzuron, buturon, neburon, methabenzthiazuron, fluometuron, chlorotoluron, diuron, chloroxuron, isoproturon, monuron, difenoxuron, fenuron, chloreturon, metoxuron, noruron, isonoruron, cycluron, benzthiazuron, dimefuron, thiazfluron, karbutilat, and ethidimuron. Two diagrams show the LC-separation of 11 and 9 of the herbicides on silica gel and reversed phase, respectively.

79-1229. Hoodless, R. A.; Sidwell, J. A.; Skinner, J. C.; Treble, R. D. (Lab. Gov. Chem., Dep. Ind., London SE1 9NQ, England) **Application of high-performance liquid chromatography to the determinatin of pesticides included in the European Economic Community Directive on fruit and vegetables.** *J. Chromatogr.* 166(1): 279-286; 1978. (8 references)

The usefulness of reversed-phase liquid chromatography using UV detection and gradient elution for the determination of multipesticide residues was examined. The multi-pesticide residues included 42 pesticide such as

organochlorines, organophosphates, carbamates, dinitro compounds, triazines, trichloromethyl-thio compounds, substituted phenoxy acids and others. A 150 x 4.6 mm I.D. stainless steel column was slurry packed with 5 μm ODS-bonded silica in methanol, and eluted with various acetonitrile-water mixtures. This procedure produced the most efficient separation of the compounds. Although this method alone is not suitable for multi-pesticide residue analysis, when combined with gas-liquid chromatography, they would provide adequate screening procedures.

79-1230. Moseman, R. F. (Anal. Chem. Branch, Environ. Toxicol. Div., Health Effects Res. Lab., US EPA, Research Triangle Park, NC 27711) **Rapid procedure for preparation of support-bonded carbowax 20M gas chromatographic column packing.** *J. Chromatogr.* 166(2): 397-402; 1978. (11 references)

A rapid and simplified procedure is described for the preparation of support-bonded Carbowax 20M gas chromatographic column packings. The heat treatment process is carried out in a 100-ml volumetric pipet in a conventional gas chromatograph. Using the described procedure, column packing can be prepared in as little as three days. Representative chromatograms of intact carbamate pesticides and underivatized polar pesticide metabolites are illustrated. (Author abstract by permission)

79-1231. Chapman, R. A.; Harris, C. R. (Res. Inst., Agric. Canada, London, Ont. N6A 5B7, Canada) **Extraction and liquid-solid chromatography cleanup procedures for the direct analysis of four pyrethroid insecticides in crops by gas-liquid chromatography.** *J. Chromatogr.* 166(2): 513-518; 1978. (4 references)

The extraction of four pyrethroid insecticides, fenpropanate (WL 41706, S-3206), permethrin (WL 43479, FMC-33297, PP, 557, NRDC-143), cypermethrin (WL 43467, NRDC 149), and fenvalerate (WL 43775, S-5602) from carrots, tomatoes celery, and onions with acetone followed by extraction of the resulting acetone-water mixture with hexane, was investigated and found suitable for residue analysis. The elution of the four materials from two types of silica and alumina adsorbents with mixtures of organic solvents of varying polarity was examined. The elution patterns and recoveries from silica gel, aluminum oxide, and water deactivated Florisil indicated potential utility in cleanup. Florisil was found to provide cleanup for asparagus, carrots, tomatoes, tobacco, and onions permitting analyses to < 0.01 ppm for most of the insecticides by electron capture gas-liquid chromatography, at extract concentrations of 1 g/ml. The other adsorbents, singly or in combination, were found to provide the cleanup required for radishes and those cases involving other crops where Florisil cleanup was insufficient. (Author abstract by permission)

79-1232. Mourot, D.; Delepine, B.; Boisseau, J.; Gayot, G. (Lab. Natl. Med. Vet., Minist. Agric. Serv. Vet., F-35300 Fougeres, France) **High-pressure liquid chromatography of a new pyrethroid insecticide, sumicidin.** *J. Chromatogr.* 168(1): 277-279; 1979. (3 references)

The HPLC analysis of the new pyrethroid insecticide, sumicidin, was performed under two systems which are described: a reversed phase system, and one involving adsorption chromatography. In the reversed-phase system, isocratic elution was performed with acetonitrule: aqueous 1% sulfuric acid (70:30). The isocratic elution of the silica gel column in the adsorption chromatography system was hexane: isopropyl ether (90:10). A flow rate of 80 ml/hr was used in a Varian LC 8500 HPLC system with the variable-wavelength UV detector set at 235 nm. The columns used were both 15 cm x 4.7 mm I.D.; one was of LiChrosorb RP-8 (particle size 10 μm), and the other of LiChrosorb Si-60 (particle size 5 μm). Results showed that on the RP-8 column the sumicidin di-asterio isomers were inseperable. The silica gel column gave complete separation of the sumicidin isomers, and no interference by alkylbenzenes was observed. This method may be used for the quantitative analysis of sumicidin in raw materials, and it does not suffer from thermal decomposition of the compound that may occur in gas-liquid chromatographic methods.

79-1233. Stoks, P. G.; Schwartz, A. W. (Lab. Exobiol., Fac. Sci., Univ. Nijmegen, Nijmegen, The Netherlands) **Determination of *s*-triazine derivatives at the nanogram level by gas-liquid chromatography.** *J. Chromatogr.* 168(2): 455-460; 1979. (13 references)

A gas-liquid chromatographic method for the determination of the triazines, cyanuric acid, ammelide, ammeline and melamine, at the nanogram level, using trifluoroacetic acid as solvent for the triazines and *N*-methyl- *N*-trimethyl silyltrifluoro- acetamide as the silylation reagent, is described. Optimal derivatization and chromatographic conditions have been determined. The relative molar response with respect to phenanthrene as the internal standard was found to remain constant for amounts of sample in the range 0.025-10 μg and the minimum detectable amount for quantitative analyses was found to be 2.5 ng (ca. 20 pmol) of each triazine.

79-1234. Brealey, C. J.; Lawrence, D. K. (Plant Prot. Div., Jealott's Hill Res. Stn., ICI, Bracknell RG12 6EY, Berks, England) **High-performance liquid chromatography of pirimiphos methyl and five metabolites.** *J. Chromatogr.* 168(2): 461-469; 1979. (7 references)

Pirimiphos methyl is an organophosphorus insecticide which is rapidly metabolized by plants and animals to several modified triesters and free hydroxypyrimidines. A method is described for the determination by reversed-phase high-performance liquid chromatography of pirimiphos methyl and its five major metabolites in plasma and urine. Separations were performed by isocratic and gradient elutions from short columns packed with SAS-Hypersil, a relatively new column packing. (Author abstract by permission)

79-1235. Pyysalo, H.; Kiviranta, A.; Lahtinen, S. (Food Res. Lab., Tech. Res. Cent. Finland, SF-02150 Espoo 15, Finland) **Extraction and determination of *o*-phenylphenol and biphenyl in citrus fruits and apples.** *J. Chromatogr.* 168(2): 512-516; 1979. (18 references)

A Likens-Nickerson instrument is used for the gas-liquid chromatography determination of biphenyl and *o*-phenylphenol in citrus fruits and apples. The Likens-Nickerson apparatus is modified as that the inner diameter of the U-tube is 11 mm instead of 9 mm, and there is a difference of 10 mm in the heights of the outlets of tube A and the U-tube. The extraction is carried out in cyclohexane and a cold trap of dry-ice is used to prevent loss of the fungicides during boiling. After the gas chromatograms are obtained, the results may be quantitated by analyzing the peak areas under the curves and comparing them to those obtained from a reference sample. The main advantage of the method is the rapidity with which it can be performed while providing recoveries of greater than 90%. Also, the high-resolution glass capillary-column GLC, no concentration of the cyclohexane extract is necessary.

79-1236. Choulis, N. H. (Sch. Pharm., West Virginia Univ., Morgantown, WV 26506) **Thin-layer chromatography and spot test of paraquat-contaminated marihuana.** *J. Chromatogr.* 168(2): 562; 1979. (3 references)

A method is described for the determination and separation of paraquat from herbicide-sprayed marihuana in the presence of other hallucinogenic compounds. Washed small samples of dry marihuana leaves were extracted in methanol and then filtered. Microquantities of the filtrates were spotted onto silica gel G plates and developed in chloroform: dioxane: ethyl acetate: concentrated ammonium hydroxide (25:60:10:5). Detection of the compounds was accomplished in iodine fumes. R*f* values for marihuana, THC, cannabidiol, and paraquat were 0.17, 0.95, 0.95, and 0.02, respectively. When chloroform: acetone (9:1) was used as solvent system, paraquat again had an R*f* value of 0.02, while THC was detected as 0.30. The detection system for the chloroform: acetone solvent was an aqueous spray solution of sodium carbonate (1%) followed by sodium hydrosulfite (1%). This latter system could also be used as a spot-test for paraquat in marihuana washed filtrates.

79-1237. Onuska, F. I.; Comba, M. E. (Anal. Methods Res. Sect., Natl. Water Res. Inst., Canada Cent. Inland Waters, Burlington, Ont. L7R 4A6, Canada) **Surface modified wall coated open tubular columns: development and application in pesticide analysis.** *J. High Resolut. Chromatogr. Chromatogr. Commun.* 1(4): 209-210; 1978. (7 references)

Capillary column gas chromatography was used to analyze for 2,3,4,6- and 2,3,5,6- tetrachlorophenol in environmental studies. Borosilicate glass (19 mm O.D. x 2.5 mm I.D.) was drawn to prepare a column of 20 m x 0.24 mm I.D. Ammonium hydrogen difluoride was used to form filamentary crystals on the inner wall, and, after heating, was washed with a 10% hydrochloric acid, methanol, acetone and ether solution. After deactivation with a 10% hydrochloric acid, methanol, acetone and ether solution. After deactivation with a 1% (w/v) solution of Carbowax, the column was heated to 290°C, and dynamically coated using a mercury plug method with a 4% (w/v) solution of OV-101 in *n*-hexane. Analyses were performed on a Dani 3900 gas chromatograph with a flame ionization detector. The method allowed the separation of the 2,3,4,6- and the 2,3,5,6- tetrachlorophenol components, and permitted the tracing of the sources of these compounds, as well as the assessment of the chemical and biological degradation processes.

79-1238. Chmil', V. D. (Author address not given) **Ispol'zovanie gel'-fil'tratsii dlia ochistki ekstraktov iz rica, soderzhashchikh gerbitsidy. [Use of gel filtration to clean up extracts from rice treated with herbicides.]** *Khim. Sel'sk. Khoz.* 16(8): 51-53; 1978. (7 references) (Russian)

The use of gel filtration for cleaning up extracts from rice treated with various compounds was studied. Different amounts of herbicides were added to small samples of rice (25-50 g). These were left for 2 hr and then separated three times with ordinary ether (50, 40, 40 and 50, 30, 30 ml, respectively). Each extraction lasted 10 min. Styrene copolymers (100 g) with 2% DVB was placed in a glass column (75 cm long, and 3.5 cm in diameter), and benzene was used to wash the copolymers from the product not used in the process. Thin-layer chromatography was used to analyze the eluate fractions. Materials which were extracted with the herbicides was found in the first phase.

79-1239. Krasnykh, A. A. (All-Union Res. Inst. Plant Protection, Leningrad, USSR) **Opredelenie despirolia v vode, pochvi i kartofele. [Determination of despirol in water, soil and potato.]** *Khim. Sel'sk. Khoz.* 16(10): 47-48; 1978. (Russian)

A chromatographic assay for determination of Despirol (kelevan; ENT-27154) residues in water, soil and potato is described. Assay consisted of extraction of pesticide from the samples with *n*-hexane, additional purification by two-dimensional chromatography and chromatography in thin fixed layer of silica gel. Minimal detectable amount of Despirol ranges from 1 to 2 μg; sensitivity of assay comprises 0.02-0.04 mg/kg. Detectability of Despirol in water, soil and potato bulbs was 80-95% and in potato haulm 50-60%.

79-1240. Gorenshtein, R. S. (All-Union Res. Anti-Phylloxera Stn., Odessa, USSR) **Opredelenie geksakhlorbutadiena v vozdukhe. [Determination of hexachlorobutadiene in the air.]** *Khim. Sel'sk. Khoz.* 16(11): 38; 1978. (4 references) (Russian)

A gas-liquid chromatographic assay for determination of soil fumigant hexachlorobutadiene (HCBD) in the air is described. Samples of air were taken 1 m above the soil level. Preparations were applied at the rate of 250 kg/ha and became incorporated in the soil up to a depth of 35-40 cm. At 18°C, HCBD content in the air showed a progressive de-

crease from 0.08 mg/m³ on day 1 after application, to 0.017 mg/m³ on day 3, 0.009 mg/m³ on day 5 and 0.004 mg/m³ on day 10. On day 30 after application the content of HCBD in the air was extremely insignificant.

79-1241. Kiriushina, L. P.; Radishevskaia, L. S.; Kholod, T. M.; Shekhter, L. A. (Res. Inst. Fish., Azov, USSR) **Opredelenie geterofosa v vode i rybe. [Determination of heterophos in water and fish.]** *Khim. Sel'sk. Khoz.* 16(11): 38-40; 1978. (2 references) (Russian)

Three methods of determination of the insecticide, nematicide heterophos (active ingredient: *O*-ethyl- *O*-phenyl thiopropyl phosphate) residues in water and fish are described. The employed methods included colorimetric assay (sensitivity: 3 μg of preparation per sample), gas-chromatography (sensitivity: 0.1 ng/sample introduced into chromatograph) and thin-layer chromatography (sensitivity: 1 μg for water samples and 3 μg for fish samples).

79-1242. Sheinina, R. I.; Tukhtamuradov, Z. T.; Abdullaeva, M.; Sakharova, L. (Middle Asian Res. & Design Inst. Food Ind., Tashkent, USSR) **Opredelenie tetrametiltiuramdisul'fida v semenakh khlopchatnika. [Determination of tetramethylthiurame disulfide in cotton seeds.]** *Khim. Sel'sk. Khoz.* 16(11): 43-44; 1978. (8 references) (Russian)

A modified chromatographic assay for determination of tetramethylthiuram disulfide (TMTD) residues in the cotton seeds is described. TMTD is incorporated into a phenthiuram (40% TMTD, 10% trichlorophenolate copper, and 15% lindane) which is used for presowing disinfection of cotton seeds. The sensitivity of method was 0.5 mg/kg.

79-1243. Lohse, E.; Lauermann, I. (Inst. Gerichtl. Med. & Kriminalistik, Bereiches Med., Martin Luther Univ. Halle-Wittenberg, Halle, DDR) **Beitrag zum Nachweis von Pflanzenschutz- und Schaedlings bekaempfungsmitteln durch Farbreaktionen und Duennschicht chromatographie. [Detection of plant protectants and pesticides by color reactions and thin-layer chromatography.]** *Kriminalistik Forensische Wissensch.* 27: 37-47; 1977. (22 references) (German)

Plant protectants, pesticides and several desinfectants (pure substances and technical products) were examined n 0.2% methanol solution. Of each solution, 20 μl (40 μg) were applied at starting point. Table 1 lists (substances in alphabetical order) the R*f* values in mobile phases I to III under the color reagent most suitable for indicating the respective substance. The data were analyzed in day light (upper lines) and in UV-light (lower lines). Table 2 shows the color reaction of all 50 compounds with 5 reagents. It also includes the R*f* values in the mobile phase III. Table 3 shows possibilities for thin-layer chromatography differentiaton through mobile phases IV and V for 3 substance groups which could not be separated by mobile phases I to III. The groups are: DDT, endrin, quintozene, and toxaphene; C_4, nicotine, thiuram, and ziram; and 2,4-DB, MCPA, and mecoprop. It was possible to visualize all substances after thin-layer chromatography in mobile phases I to III. Except for quintozene, a pentachloro nitrobenzene, all substances had an R*f* value of ≥ 0.05 to ≤ 0.95 in at least one mobile phase. Up to 92% of these values ranged from 0.10 to 0.90.

79-1244. Richter, M. (VEB Wiss. & Tech. Tabakind., DDR-8021 Dresden, DDR) **Ueber die Untersuchung von Organochlor- Insektizidrueckstaenden in Tabak und Tabakwaren. 1. Mitt. Die Analysenmethode. [Study of organochlorine pesticide residues in tobacco and tobacco products. Part 1. The analytical method.]** *Nahrung* 22(9): 759-768; 1978. (1978 references) (German)

A gas chromatographic method for the quantitative serial estimation of organochlorine insecticide residues in tobacco is described. Following column chromatographic clean-up, the preparations are subjected to qualitative and quantitative gas chromatography. In 5 g of tobacco the detection levels were: 0.001 ppm for hexachlorobenzene, α-BHC, lindane, heptachlor, aldrin, and heptachlor epoxide; 0.01 ppm for TDE; 0.02 ppm for *o,p'*-DDT, α-endosulfan, and β -endosulfan; 0.03 ppm for endosulfan sulfate, and 0.05 ppm for *p,p'*-DDT.

79-1245. Sustek, J.; Livar, M. (Res. Inst. Agrochem. Technol., CS-81600 Bratislava, Czechoslovakia) **Ultraviolet spectrophotometric determination of the purity of technical pyrazon.** *Pestic. Sci.* 9(5): 387-392; 1978. (7 references)

A method for the analysis of technical samples of the herbicide pyrazon is described. A double-beam recording spectrophotometer with digital data recording accessory was used in the analysis of the multicomponent mixtures. The absorbances were measured in the UV region between 346 and 282 nm. Two alternative UV spectrophotometric methods are presented which allow the determination of all three components in technical products of pyrazon without any preliminary separation. (Author abstract by permission)

79-1246. Pickova, J. (Klin. Nemoci & Povolani, CS-12000 Prague 2, Czechoslovakia) **Stanoveni paraquatu v moci. [Paraquat determination in urine.]** *Prac. Lek.* 30(7): 266-267; 1978. (8 references) (Czech)

Paraquat was determined in the urine according to Calderbanc's ion exchange method using the Ostion KS and Varion KS cation exchange resins. Paraquat was eluted from the ion exchange resin with ammonium chloride, and reduced. The measurements were performed at the wavelengths of 600 nm and 396 nm. Measurement at 600 nm proved to be suitable for concentrations higher than 30 μg.

79-1247. Rus, V.; Crainiceanu, A. (Author address not given) **Determinarea prin analiza gas-cromatografica a unor insecticide organoclorurate si organofosforice. [Gas chromatographic determination of some organochlorine and organophosphorus insecticides.]** *Rev. Chim. (Bucharest)* 29(7): 673-677; 1978. (13 references) (Rumanian)

The gas chromatographic determination of organophosphorus and organochlorine insecticides and their mixtures in different substrates (soil, corn meal, whole blood) was studied. It was possible to separate the mixture of 14 insecticides (hexachlorobenzene, α-BHC, lindane, heptachlor, aldrin, β-BHC, δ-BHC, heptachlor epoxide, *p,p'*-DDE, dieldrin, *o,p'*-TDE *o,p'*-DDT, *p,p'*-TDE, and *p,p'*-DDT) by the use of a column filled with three stationary phases (QF-1 + OV-11 + XE-60). Six organophosphorus insecticides (dipterex (trichlorfon), ronnel, methyl parathion, malathion, parathion and ethion) were successfully separated on a column filled with a mixture of two stationary phases (QF-1 + DC-200). The use of specific detectors allows the detection of very small quantities of compounds (even below pg levels). The use of a flow divider (1:1) allowed an increased number of data concerning an unknown mixture of insecticides when two specific detectors or two columns and two specific detectors are operated simultaneously.

79-1248. Talcott, R. E. (Div. Toxicol. & Physiol., Dep. Entomol., Univ. California, Riverside, Riverside, CA 92521) **Hepatic and extrahepatic malathion carboxylesterases. Assay and localization in the rat.** *Toxicol. Appl. Pharmacol.* 47(1): 145-150; 1979. (14 references)

A colorimetric assay of malathion carboxylesterase was developed by coupling the hydrolysis of malathion to the reduction of a tetrazolium dye. This assay system was used to measure the malathion carboxylesterase activities of various rat tissues and of subcellular fractions of rat liver. In terms of activity per tissue, the liver contained the greatest amount of carboxylesterase, three-fourths of which could be attributed to the microsomal fraction. Preparations of liver mitochondria, blood serum, kidney homogenate, and lung homogenate also contained malathion carboxylesterase. The carboxylesterase of blood serum manifested an apparent Michaelis constant of 20μM, threefold lower than that observed in liver homogenate, and contributed most of the extrahepatic activity. These results support the view that extrahepatic malathion hydrolysis may partially account for the resistance of the rat to malathion poisoning. (Author abstract by permission)

79-1249. Veith, G. D.; Austin, N. M.; Morris, R. T. (US EPA, Environ. Res. Lab. Duluth, Duluth, MN 55804) **A rapid method for estimating log *P* for organic chemicals.** *Water Res.* 13(1): 43-47; 1979. (8 references)

On a permanently bonded (C-18) reverse-phase high-pressure liquid chromatography system, the logarithm of the retention time (log *RT*) of organic chemicals is linearly related to the logarithm of the *n*-octanol water partition coefficient (log *P*). A technique has been developed to estimate log *P* of organic chemicals that is both rapid and inexpensive. Based on reverse-phase high-pressure liquid chromatography, the method consists of a preparation Micro-Pak C-10 reverse phase column using a water: methanol solvent (15%:85%) flowing at 2 ml/min at room temperature. When benzene, bromobenzene, biphenyl, bibenzyl, *p,p*-DDE and 2,4,5,2',5'-pentachlorobiphenyl are used as reference standards of known log *P*, a linear calibration of the logarithm of retention time with the logarithm of the log *P* is achieved. The log *P* of other organic chemicals may be estimated with a mean accuracy of 22.8% of log *P* levels previously calculated by using a calibration mixture. This technique allows an estimation of log *P* values in under 25 min, and the chemical structure of te compound need not be known for the estimate.

79-1250. Eichner, M. (Chem. Landesuntersuchungsanst., D-7600 Offenburg, BRD) **Schnelle Pesticid-Rueckstandskontrolle bei pflanzlichen und tierischen Lebensmitteln, sowie Tabak und Tabakerzeugnissen durch Sweep-Co-Analyse. I. Mitteilung. [Quick pesticide-residue control in plant and animal food products and tobacco and tobacco products by sweep-co-analysis. I. Report.]** *Z. Lebensm. Unters. Forsch.* 167(4): 245-249; 1978. (18 references) (German)

The operating principle of the sweep-co-distillation method (SCD) is outlined and presented in a schematic diagram. The output data for 35 organophosphorus compounds in 20 different substrata and for 30 organochlorine compounds in 14 substrata (after automatic purification in SCD with 0.03-0.5 and 0.003-0.05 mg/kg respectively of the active substances) are given in two tables.

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